

AMERICAN VETERINARY REVIEW

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AMERICAN VETERINARY REVIEW.

JANUARY, 1909.

EDITORIAL.

EUROPEAN CHRONICLES.

PARIS, November 15, 1908.

THE ULTRAVISIBLE VIRUSES.—*The Ultravisible Viruses* is the title of a long article published in three numbers of the *Journal of Comparative Pathology and Therapeutics*, by Sir John McFadyean, the learned veterinarian, principal and dean of the Royal Veterinary College and president of the Royal Veterinary College of England; an article which is like all that comes from the pen of Sir McFadyean, full of interest and valuable suggestions.

Beginning by saying that, "During the last thirty years the application of the method of researches initiated by Koch and Pasteur has revealed the fact that the cause, formerly vaguely designated 'the virus,' of many of the contagious or infectious diseases, is the presence within the body of animal or vegetable parasite (bacteria or protozoa) which, although minute, can be made manifest to the eye by the use of the microscope 'and that' in all these cases the term 'virus' has lost its former usefulness; there are yet a considerable number of cases where that term is still the only one that is justified in speaking of the cause of the disease. There are, indeed, contagious, infectious or inoculable diseases in which the ordinary bacteriological methods, so fruitful in other cases, have entirely failed to resolve the virus into a visible micro-parasite. Perhaps in some cases fur-

ther investigations may show that the cause micro-parasite, has been overlooked; but in other cases there appears to be sufficient reasons for abandoning such expectations and for holding that the causal parasites have not been simply seen, because they are too minute to be made visible to the eye, and thus a group of diseases has to be recognized as caused by "*ultravisible viruses*;" bearing in mind, however, that the belief that the viruses of certain diseases are ultravisible, rests mainly on the fact that filters which are efficient for the arrest of the smallest of the known visible microbe, such as that of fowl cholera bacillus or the bacillus of influenza, allow the viruses of these diseases to pass through their pores.

Following this opening of the subject, the writer initiates us to the use of the domestic filter, and principally to those used in laboratories for scientific purposes; such as the Chamberland and the Berkefeld, with their different degrees of closeness and density, giving wise advice as to the manner of regulating the process of filtration, and closes what might be called the preface of the article.

* * *

We are now entering into the consideration of the diseases so far known, for which the denomination, ultravisible viruses, can find its application. But between the visible and ultravisible, there is a certain gap, not very wide to be sure, and these ultravisible bacteria do probably differ among themselves in size. "We, however, as a matter of fact, know at least one bacterium which is just on the borderline, between the visibility and ultravisibility, and that is the bacterium of contagious bovine pleuropneumonia, which Nocard and Roux succeeded in cultivating in collodion capsules of broth, introduced into the peritoneal cavity of the rabbit and subsequently in vitro, and which with a magnification of 2,000 and a brilliant light, they recognized just on the limit of visibility and which they inferred had a diameter somewhere between $1/5$ th and $1/10$ th of a micron, say one-fifth or one-tenth of the size of a fowl cholera bacillus." The virus of pleuro-pneumonia, therefore, belongs to the visible and

not to the ultraviolet class, is cultivable with more or less success outside of the body, but owing to its small size cannot be identified in the diseased tissues or exudates, in which it is still for all practical purposes invisible. Then proceeding with the enumeration and detailed consideration of the viruses with the established claims to be regarded as ultraviolet, the author treats on them in a long and interesting study, of which I will only make concise extracts.

1st. THE MOSAIC OR SPOTTED DISEASE of the tobacco plant. The juice of diseased plants retains its infective power after it has passed through a porcelain filter. The virus has great resisting power and can be inoculated.

2d. FOOT AND MOUTH DISEASE.—The first disease of animals where Loeffler and Frosch discovered that its virus is not arrested by a porcelain filter, although in their experiments they were brought to the conclusions "that the virus was particulate in its nature since repeated passages of the diluted lymph through the close-grained Kitasato filter rendered the liquid non-infectious." Fruitful as the discoveries and researches have been on the nature of the virus, nothing beyond the fact that it is ultraviolet has been gained.

3d. AFRICAN HORSE-SICKNESS.—In 1900 Sir McFadyean wrote that the cause of horse sickness was an ultraviolet virus and was uncultivable. From his experiments, he also showed that it is far less fragile than most of the other ultraviolet viruses.

4th. FOWL-PLAGUE.—Name given by Italian scientists to a disease that prevailed in Italy, which, although it resembles fowl cholera, differs from it principally by the absence of the easily recognized fowl cholera bacteria in the blood. The virus of Fowl-Plague is ultraviolet, passing through a Berkefeld filter. All attempts to cultivate outside of the body have failed.

5th. YELLOW FEVER.—The first human disease due to an ultraviolet virus, which has not yet been cultivated artificially.

6th. CATTLE PLAGUE.—The virus of which passes through a filter which arrests the smallest visible bacteria.

7th. SHEEP POX.—For Borel the virus largely diluted passes a Berkefeld filter and the filtrate is sometimes infective. But Chamberland's filter arrests it.

8th. EPITHELIOMA CONTAGIOSUM OF BIRDS.—Virus is contained in nodules which develop in the epidermis of legs and wings. Sometimes and almost generally arrested by filtration and sometimes not. It is said not to be necessarily invisible and may be at least as large as the organism of bovine pleuropneumonia. The virus has not yet been cultivated artificially.

9th. SWINE FEVER (Hog cholera).—Referring to the late work done in the United States and that done by himself, the author, after having said that acute and chronic or mild outbreaks of swine fever are caused by ultraviolet virus, writes: "The virus has so far proved to be uncultivable as well as invisible."

10th. RABIES.—If Nocard and others have said that the virus of rabies was not filtrable, Remlinger showed that under some conditions it passed a Berkefeld filter, if it was arrested by a close-grained Chamberland. Up to the present time the virus has not been cultivated and its actual nature is uncertain.

11th. COW-POX.—The virus is filtrable, but may, like the virus of bovine pleuropneumonia, not be entirely invisible.

12th. EQUINE PERNICIOUS ANEMIA.—Of all diseases which to the point of view of veterinary pathology is of the greatest interest. The ultraviolet of its virus being well established by the experiments and researches of Carré and Vallée.

13th. CANINE DISTEMPER, which according to Carré is due to an ultraviolet microbe.

14th. BLUE TONGUE, an interesting ovine disease of South Africa, which appears to have many analogies with horse-sickness. The virus is filtrable.

15th. LEUCOCYTHEMIA IN FOWLS.—Affection not uncommon in Denmark, caused by an ultraviolet virus, which appears to be uncultivable.

* * *

The space that is allowed me does not permit going in all the details that one can find in the second part of the articles just considered and for more complete information I must refer the reader to the originals, where will be found the entire summary of the article of Sir John McFadyean. In part, it reads as follows: "From the preceding survey, one can see that the diseases caused by ultraviolet viruses form a remarkably heterogeneous group. When compared with one another they exhibit differences almost as great as one finds among the diseases caused by visible bacteria. Some of them, such as foot and mouth disease, are among the most contagious diseases known, while others, such as rabies, horse-sickness and blue tongue, are neither contagious nor infectious in the ordinary sense of the words. Some of them, such as horse-sickness and fowl plague, appear to be of a septicæmic type. * * * In most of them, however, there are extensive structure alterations, as illustrated in swine fever, sheep pox and epithelioma contagiosum. With regard to the viruses themselves, it is obvious that they vary considerably in size. * * * One remarkable feature common to the whole of the ultraviolet viruses is that they have hitherto resisted to all attempts to cultivate them in artificial media outside the body. Assuming that these viruses are bacterial in their nature, one has great difficulty in understanding why this should be so, for one does not see why the ability of a bacterium to grow under artificial conditions should in any degree be dependent on its size. * * * Another character common to all the ultraviolet organisms, is that they appear to be obligatory parasites. No morbid condition of a sporadic character has yet been found to be caused by an ultraviolet virus, and such viruses with a saprophytic habit, are also unknown. * * * In the last place, attention may be called to certain possibilities, which are suggested by the facts recently ascertained in connection with one of the diseases caused by an ultraviolet virus, viz., swine-fever. * * * Assuming that the lesions, that have always been regarded as characteristic of swine fever, are secondary in

their nature, as advanced lately, and caused by an organism which does not constitute the actual cause and contagium of the disease, the question naturally arises: May not this be true for what are regarded as the essential lesions of some other diseases? In considering what answer should be given, it is well to remember that until the discovery of the ultravisible virus of swine-fever, the claims of the swine-fever bacillus to be regarded as the cause of the disease were generally regarded as satisfactorily proven. But as Dorset, Bolton and McBryde have pointed out, a mistake was made in accepting the effects produced by cultures of the bacillus, when administered to pigs by the mouth, as the exact equivalent of a natural attack of swine-fever! That these effects could not be so regarded was proved by showing that the disease experimentally set up by the bacilli, was not at all contagious, even under the most favorable circumstances, whereas, as is well known, swine-fever is a strikingly contagious disease." "Therefore, it is clear that when any one, as part of the evidence proving that an organism is the cause of a particular contagious disease, claims that he has successfully employed pure cultures of that organism, he ought to show that the experimentally induced disease, when afforded the opportunity, spreads by contagion like the natural disease. And when one reflects on the nature of the evidence, on which it has been held and very generally accepted, that particular bacteria are the cause of contagious diseases, it becomes manifest that in some cases, the proof is no more complete than it was in the case of swine-fever. It is not, therefore, improbable that future investigations, conducted on the lines necessary for the detection of an ultravisible virus, may bring on certain bacteria, at present accepted as the cause of disease, the discredit that has already fallen on the so-called bacilli of swine-fever, swine-plague and canine distemper."

Does it not seem, after all this, that the field of investigation for the bacteriologists is far from being exhausted?

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ALTERATIONS OF THE SUB-MAXILLARY GLAND DURING AN ATTACK OF RABIES.—The researches for the discovery of the microbe of rabies are already very numerous and many are the investigations that have been made and recorded relating to the study of the most minute alterations of the central nervous system, which is the one most affected in rabies and that contains the rabid virus. Since the discovery made by Negri in 1903, these researches have been renewed with the expectation that the discovery might be made, and if the nervous centre has been the principal object, the pathological morphology of the other organs has received much less attention; with the exception of those on the cardiac muscle, the pancreas and other glands made by Doct. A. N. Adamoff, of Petersburg. In the Archives of the Imperial Institute of Experimental Medicine, to which I alluded in my last chronicle, I noticed an article, headed "Alterations of the Sub-Maxillary Gland During an Attack of Rabies," published by Doct. W. W. Podwysotszki, who related a series of experiments, which he has made with the object of studying the alterations met in one of the important organs which contain the rabid virus, viz., the salivary glands. Among the three large glands that secrete saliva, he selected the sub-maxillary because it is a mucous gland and as such, all the pathological alterations which occur in the structure of its cells would be more marked than they would be in a serous gland. If the pathological morphology of salivary glands in rabies has been neglected, it is evidently because after the great researches of Pasteur upon rabies, the attention of almost all scientists has been attracted either upon its method of preventive injections or upon the study of the lesions of the central nervous system, the principal seat of the disease. And yet it is certain that not only the virus is eliminated with the saliva, but that it exists in the salivary glands. The question is, however, yet the object of discussion. The researches of the author were carried upon the sub-maxillary gland of dogs that died with rabies (street virus) and of rabbits inoculated with fixed virus. He has studied comparatively the gland of mad dogs and that of healthy sub-

jects, submitted to various degrees of activity. This last being realized artificially with injections of pilocarpine, by irritation applied on the cordae tympani, the sympathetic, etc., etc.

* * *

From the series of experiments and researches made by Doct. Podwyssotzki, he draws the following conclusions:

1. Among the characteristic lesions in rabies of dogs, which permits the recognition of street rabies, those of the sub-maxillary gland must not be overlooked.

2. In rabies, there are alterations in the secretory elements of the gland, in the cells of the efferent canals, in the interlobular connective tissue and in the nervous ganglions of the gland.

3. The lesions of the secretory epithelium occur in masses, they are not diffuse. The epithelium undergoes an albuminous and fatty degeneration which gradually becomes necrotic. The diseased lobules contain a small number of isolated leucocytes.

4. This character of the lesions in masses is also observed in the inter-lobular connective tissue. They are progressive and located principally around the diseased lobules, then they spread gradually. Where the interstitial tissue is most altered, granuloma and nodules (rabid nodules) are formed, similar to those found in some parts of the nervous system.

5. In the numerous microscopical nervous ganglions that are found in the gland, the same process of degeneration and destruction of the nervous cells with formation of granuloma (rabid nodules) already mentioned in the cerebro-spinal and cardiac ganglions, take place. The nervous cells which are on the point of death are gnawed and eaten by neoformed macrophages.

6. The efferent canals are packed with secretory granulations, which being united, form globes and masses which mix with the cellular elements.

7. In the sub-maxillary gland of rabbits dead with fixed virus, alterations in masses of the glandular lobules are observed.

The interlobular interstitial tissue and the microscopic nervous ganglions in the gland of the rabbit are not altered.

8. No corpuscles of Negri are found in the sub-maxillary gland neither of rabbit nor dog. The big mucinogenous secretory granulations, which are acidophil as the peripheric parts of the corpuscles of Negri, resemble these much, and this resemblance may be a cause of error to an inexperienced observer.

9. In the salivary glands of animals dead with rabies, a very great number of secretory granulations are observed and also giant cells in glands freshly dissociated.

10. The corpuscles of Negri do not constitute the active rabid virus. The true virus on account of its small dimensions is inaccessible to our sight.

* * *

A STUDY OF THE ACTION OF BACTERIAN FLORA OF THE DIGESTIVE CANAL.—The bacterian flora of the digestive canal has already been the subject of frequent researches with the object of studying its action in the process of digestion. Most generally, dejections were used as material for researches; or again, cadaveric fœces and finally in the products of excretion through fistulas, in which cases their exact localization was not always possible. It is evident that these methods not only do not allow a sufficient exactitude in the study of the bacterian flora of the digestive canal during the life of the animal, without saying anything of the changes that this flora undergoes in one or in another part of the digestive tract; but besides they present some inconvenience from the technical point of view.

It was for this reason that Doct. Aimee Horowitz made the experiments that he related in the Archives of St. Petersburg. He made fistulas on six dogs. In one on the great curvature of the stomach, in another near the pyloric portion of the duodenum, in a third at the end of the duodenum, in a fourth at one metre from the duodenum, in the fifth one metre from the cœcum and on the sixth at the end of the small intestine. The researches of the bacteria in the contents of the stomach and small intestines were made in the six dogs, either when the stomach was empty

or after the animal had fasted 24 hours. In a second series of experiments, after a meal of milk, and in a third, after having eaten the white of a cooked egg. The food was always given after being sterilized. To obtain material for observation through the fistulas, all precautions were taken to avoid possible infection from outside.

The following are the conclusions of the results obtained :

1st. The quantity of bacteria in the stomach and intestines increases regularly from upwards downwards. It is not great in the empty stomach and increases during digestion.

2d. The bacterian flora of the small intestine is composed of permanent and accidental species. These last disappear rapidly.

3d. The permanent bacteria live in special regions of the small intestine, some in the superior, others in the inferior; some such as the (*B. Coli* is met indifferently everywhere.

4th. During the digestion of different food, one will observe in the small intestine, the marked pullulation of some specie, as *Bac. ac. lactici* with a milk diet, *Proteus vulgaris* after eating white of eggs.

5th. Some permanent bacteria of the small intestine, specially those of the lower portion, peptonize and separate the proteic matter; the majority have a certain action on the hydrates of carbon; for instance, transform lactose into lactic acid.

6th. Saprophites, which do not belong to the series of permanent bacteria of the digestive canal, die rapidly when they enter it.

7th. Of all the digestive secretions, pure gastric juice alone kills bacteria. Bile, and biliary acids, pancreatic and intestinal juices are excellent nutritive media.

8th. The products of digestion of proteic substances, that is, their mixture with the juices, are also favorable media for the development of bacteria.

9th. Permanent bacteria of the small intestine prevent *in vitro* the development of facultative saprophites bacteria, which die after one or two days of cohabitation with the *bacillis coli*.

* * *

NEW CONTRIBUTION TO THE STUDY OF VACCINATION OF BOVINES AGAINST TUBERCULOSIS.—If our readers remember the allusions that I have made some time ago to the possible immunity that could be granted to cattle against tuberculosis as attempted by some scientists, by way of the digestive tract, I suppose that the following conclusions that Docts. A. Calmette and C. Guérin advance in the "*New contribution to the study of vaccination of bovines against tuberculosis*," which they have published in the *Annales de l'Institut Pasteur*, will be interesting. These conclusions are the results of experiments to test again the possibility of vaccinating cattle by the digestive canal and also the comparative results as obtained by intravenous injections.

1st. By the ingestion of tuberculous bacilli, virulent or modified by heat, one may give to young or adult bovines a relative immunity. When, afterwards, the resistance of the animals so prepared, is tested by giving them a massive dose of virulent bacilli, which would surely infect witnesses, it will be observed that, after from four to six months, they remain free from disease, do not react to tuberculin and that their mediastinal, mesenteric, bronchial and retropharyngeal lymphatic glands contain tuberculous bacilli no more. Inoculations with these glands to guinea pigs remain negative.

2d. By opposition, when, from eight to twelve months, after having resisted to a massive infection by the digestive tract, bovines, thus supposed vaccinated, received by intravenous injections, a dose of virulent tuberculous bacilli, sufficient to kill witnesses in four or five weeks with acute granule, it is found that the vaccinated animals, after a short lapse of feeling ill, keep for six or eight months all the appearance of perfect health. *They, however, keep in their bronchial, and mediastinal glands, virulent bacilli, which can give tuberculosis to guinea pigs.* These bacilli give no manifestation of their presence, not even the positive reaction to tuberculin. But when, after about six or eight months more, immunity of the animal disappears, these bacilli become susceptible of creating tuberculous lesions.

3d. Tuberculous bacilli from cultures, introduced by the *digestive tract* then, after a various length of time, finish by being resorbed in the mesenteric glands, where they are not in sufficient number to create lesions, while introduced by *intravenous injections* they remain *living* and *virulent* in the lymphatic glands of the thoracic organs.

4th. *Tuberculous animals* or those *sensibilized to tuberculin* by two or three massive injections of that substance in the veins, offer a very great resistance to reinfections or to severe tuberculous infections, natural or artificial, even if these are made by the intravenous method.

Although smaller, this resistance seems to be of the same nature as those obtained by vaccinations, either by intravenous inoculations of human or bovine bacilli (Behring, Koch and Schultz), or of homogenous bacilli (Arloing) or by subcutaneous inoculations of these same bacilli (Lignieres, Arloing), or again by insertion under the skin of collodion sacs containing cultures of bovine or human tuberculosis (Heymans).

Then *it is not in any way a true immunity*, because the animals, thus vaccinated, although not reacting to tuberculin, remain *carriers of living and virulent bacilli* and that those are able, when the resistance diminishes to create in the organism of these same animals serious lesions, and again because, as Roux and Vallée have demonstrated, vaccination by venous or subcutaneous methods do not protect against intestinal infection.

* * *

BIBLIOGRAPHY.—Some short time ago a warm friend of mine wrote me from America asking what I thought of an excellent German work on Internal Pathology being revised and brought to modern ideas and discoveries. I answered him that while the work he referred to was very good and one whose general arrangement was superior, I would rather suggest the entire writing of the book, as it was certainly beyond possibility to revise a work written forty years ago, in a manner sufficient to bring it to scientific modern standing.

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When I wrote this I had in mind the success obtained by Cadeac's Encyclopedia and principally to that part of it that treats of *Internal Pathology*. It is but a short time since the first edition has come out and already it is exhausted. A second edition is now offered for sale. I have noticed already the first part, that which treats of the mouth, pharynx and stomach. To-day it is the second volume of the second edition of *Internal Pathology*, continuation of the digestive apparatus, the Intestines.

This volume is, properly speaking, not a revised copy of the first edition. It is an entirely rewritten work, with nearly 150 pages more of reading matter, with 153 more illustrations and with a different arrangement which will prove to all readers of great advantage. Published by the firm of Bailliere and Sons it will certainly meet with as much success as the first.

Decidedly, no, it is useless to revise an old German work, superior as it was forty years ago.

* * *

Among the other communications that I must acknowledge, I may mention: The Report of the works done at the Bacteriological Institute of Halle, by Doct. L. Raebiger; the *Agricultural Journal of Cape of Good Hope*, with an excellent practical article by Dr. W. Robertson, M.R.C.V.S., director of the veterinary laboratory at Grahamstown, on *Tuberculosis in animals and its Relation to Public Health*; a copy of the *Industrial* with catalogue of the Kansas Agricultural College; the Chicago Veterinary College *Bulletin*, and the catalogue of the Colorado State College of Agriculture, department of veterinary science.

And as I am closing, there arrived from Keener & Co., of Chicago, the authorized English translation of Friedberger & Frohner, which I will review in my next.

A. L.

THE BUREAU'S EFFECTIVE WORK.

In the December issue of the REVIEW reference was made to the appearance in this country of the European foot-and-mouth

disease, and the alarm that was felt that it might spread throughout the great cattle-raising states of the west and southwest and thereby jeopardize the entire live stock industry of the country, but thanks for the prompt, energetic and drastic work of Secretary Wilson, and Dr. A. D. Melvin, Chief of the Bureau of Animal Industry, in co-operation with state officials, to restrict and exterminate the disease, for it is believed by the authorities at this writing, that they have not only checked its further spread, but have stamped it out and they are now gradually, as conditions warrant, removing the quarantine regulations that were found necessary to prevent a spread of the contagion to the vast area of the country unaffected by the disease. The prompt mastery of this highly contagious and dreaded plague, which is always more or less prevalent in certain countries of Europe, speaks volumes for the efficiency of the work of the Bureau of Animal Industry and the respective state authorities. They arose fully equal to the task of coping with the dangerous and threatening outbreak, and all it meant to one of the most vital and important industries of the country.

At this time the Bureau is engaged in conducting an investigation to determine the origin of the outbreak, but the REVIEW is informed by Chief Melvin that it has not as yet progressed far enough for him to be able to announce definite results, that would enable him to make positive statements as to the source of the infection.

In the copy of "Service Announcements," issued by the Bureau under date of December 15, is contained, Chief Melvin states, as much as he is now able to say regarding the origin of the outbreak. That publication also contains a statement of the situation up to the date mentioned, and as it is practically a history of the outbreak and a statement of what work has been done by the Bureau, the affected territory and the methods pursued for its eradication, the REVIEW believes that it will prove of interest to its readers and takes the liberty of quoting from it.

"For the second time in recent years the bureau is engaged in a campaign for the eradication of foot-and-mouth disease.

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The affected states are Michigan, New York, Pennsylvania and Maryland. The disease was first observed in the vicinity of Danville and Watsonstown, Pa., and was reported to the bureau by the state veterinarian of Pennsylvania, November 10. The Chief of the Bureau, accompanied by the chiefs of the inspection and pathological divisions, at once went to Danville and confirmed the diagnosis. A quarantine was declared November 12 against the interstate movement of animals from four counties in Pennsylvania. Within a few days the disease was also found in several other counties of Pennsylvania and in the vicinity of Akron, New York, and on November 19 the quarantine was extended to include the entire territory of those two states. It appeared that the cattle causing the Pennsylvania outbreak came through the Buffalo stock-yards, and from Buffalo suspicion pointed to Michigan. Investigations in the latter state confirmed the presence of the disease in several herds near Detroit, and on November 24 the state of Michigan was quarantined. A few days later the disease was also found near Lineboro, Maryland, and that state was quarantined.

The work of eradication is being carried on vigorously in co-operation with the state authorities. The diseased and exposed cattle are being slaughtered and buried and the premises disinfected. The department pays the owner two-thirds of the appraised value of his stock and the state pays the remaining one-third. Other expenses are shared in the same proportions.

The localities in which the disease has so far been found are as follows: Michigan—Oakland and Wayne counties; New York—Erie, Genesee, Monroe and Niagara counties; Pennsylvania—Chester, Clinton, Dauphin, Delaware, Juniata, Lancaster, Lehigh, Lycoming, Montgomery, Montour, Northumberland, Philadelphia, Snyder, Union and York counties; Maryland—Carroll county.

One hundred and forty-eight herds or premises have been found affected, as follows: In Michigan, 8; in New York, 44; in Pennsylvania, 94; in Maryland, 2. Practically all of the diseased and exposed animals discovered up to date have been

slaughtered and the work of disinfection is well advanced. A careful canvass of the infected districts is being made, the inspectors going from farm to farm inspecting the animals in order to make sure that no cases have been overlooked.

It is evident that the present outbreak had its origin in the vicinity of Detroit, Mich., but the investigation has not progressed far enough to determine the exact manner in which the animals became infected. In view of the bureau's strict quarantine on imported animals and the fact that no animals are allowed to be imported from countries where foot-and-mouth disease is known to exist, it has all along been considered highly improbable that the contagion was brought in with imported live stock. It is therefore believed that it must have been introduced in some other way.

It was fortunate that in this emergency the bureau had a large force of trained veterinarians, many of whom had had experience in the New England campaign of 1902-03, who could be promptly assigned to the work of eradication. The good work being done by the force is much appreciated, and the chief is confident that it will lead to another creditable achievement by the bureau in effectively dealing with outbreaks of contagious disease which have menaced the live-stock industry of the country. It is highly important that the contagion should be promptly and completely eradicated, and it is expected and believed that every individual employee engaged in this work will realize his great responsibility and will do all that he can to bring about a successful result.

Members of the force outside of the quarantined area should be on the lookout for new cases of the disease and should promptly report any rumors indicating that it may have spread beyond the localities already known to have been infected."

Following the above well-deserved compliment for the efficiency and skill of the Bureau inspectors in charge of the work of eradicating the disease, their names are given as follows: for Maryland and Pennsylvania: Dr. S. E. Bennett; for New York, Dr. U. G. Houck; for Michigan, Dr. P. H. Mallowney.

The regulations put in force absolutely prohibited the movement of cattle, sheep, other ruminants and swine from each of the states of New York, Pennsylvania, Michigan and Maryland, for any purposes whatever; and it was very largely through this drastic stand taken, along with other preventive measures adopted, that at this writing the REVIEW is in a position to state that the disease has been, it is believed, obliterated from this country.

So prompt and efficacious was the quarantine, the slaughter of diseased and exposed animals and the system of disinfection of premises carried on, that, only one diseased herd has been found since December 11. In a letter to the REVIEW under date of December 23, Chief Melvin says, "While I hope the contagion has now been eradicated, it is, of course, possible that some further cases may be discovered, and a careful canvass from farm to farm in the infected regions is now being made in order to detect any cases that may not have been previously reported. The Federal quarantine in the states of Maryland and Michigan has been modified so as to permit the interstate shipment of live stock for immediate slaughter from those states except from parts of Carroll and Baltimore counties in Maryland, and from Macomb, Oakland, Wayne, Washtenaw and Monroe counties in Michigan, provided the authorities of the state to which the animals are destined have previously signified their willingness to accept them. The modified regulations also permit the interstate movement of hay, straw, and similar fodder, and hides, skins, and hoofs from points in Michigan and Maryland, except the counties and parts of counties named, without disinfection or certification. The quarantine has been modified in this way because no infection whatever has been found in Maryland and Michigan outside of Carroll county, Maryland, and Wayne and Oakland counties, Michigan. The Department will modify and finally remove the quarantine on the other states just as soon as it feels that this can be safely done, but as new cases were found in the New England outbreak of six years ago, several weeks after it was supposed that the disease had been

completely eradicated, we can not afford to take chances on raising the quarantine prematurely. The total number of animals slaughtered as diseased or exposed was 3,605 on 154 farms or premises. The total appraised value of these animals was \$88,269.08, of which two-thirds has been, or is to be paid by the Federal Government, and one-third by the states. The figures for the different states are as follows: Michigan, 9 premises, 242 cattle, 23 hogs, 9 sheep, 3 goats, value \$5,359; New York, 45 premises, 520 cattle, 246 hogs, 214 sheep, value \$24,378.13; Pennsylvania, 98 premises, 1,202 cattle, 999 hogs, 52 sheep, 4 goats, value \$56,903.12; Maryland, 2 premises, 31 cattle, 60 hogs, value, \$1,628.83."

The general public and the live stock interests of the country have escaped through the intelligent and vigorous handling of this scourge that would without doubt have proven a great calamity, financial and otherwise, and the REVIEW takes pleasure in commending the work of Chief Melvin, the state officials and the force of trained veterinarians for their splendid work in this great emergency, all the more so because they not only confined and held the disease under control in the sections in which the outbreaks occurred, but speedily eradicated it and thereby saved the country at large from an immense financial loss. It is another splendid demonstration of the ability of the Bureau of Animal Industry to cope with and stamp out any contagious disease outbreak that may occur in the future, and this fact should prove a source of widespread confidence to the owners of cattle as well as the live stock interests and the public in general. The Bureau went at the work promptly and drastically. There was no temporizing and the result is most gratifying.

WHERE IT WOULDN'T WORK.—His Teacher—Don't you know, Tommy, you should not let your left hand know what your right hand does?

Tommy—Yes'm, but you've just got to take both hands when you want to tie a tin can to a dog's tail.—(*Chicago Tribune.*)

*Address be
D. C., Oct. 2, 1

ORIGINAL ARTICLES.

THE PROBLEM OF BOVINE TUBERCULOSIS CONTROL.*

BY DR. M. H. REYNOLDS, UNIVERSITY OF MINNESOTA, EXPERIMENT STATION,
AND STATE LIVE STOCK SANITARY BOARD.

A brief review of its historical development may perhaps prove helpful in a careful study of this great problem.

Historical.—At the beginning in each state there has been either an amateurish and premature attempt at eradication with unsatisfactory and harmful results or else there have been irregular testing of herds here and there just because owners wished to know whether their herds were sound, or because they wished to really try the tuberculin test. Such work has been fragmentary and has accomplished little of permanent value.

After a considerable period of this kind of work there has come better organization of individual state work and there have followed inspection ordinances providing for tuberculin test of dairy herds.

Following the adoption of such ordinances and the first attempts to put them in force, there has been quite uniformly a prolonged period of frantic opposition by dairymen and fearful anticipation of dire results that were sure to befall the dairy interests and the public milk supply. Most of these ordinances have led a precarious sort of existence with many ups and downs, suffering adverse court decisions and many amendments and revisions. But in the meantime the public has been gradually awakening to the fact that there were such things as clean dairies and dirty dairies and that tuberculosis of cattle was not altogether a myth but possibly a matter of serious concern. Eventually the dairymen have uniformly fallen into line, con-

*Address before Section VII. Sixth International Congress on Tuberculosis, Washington, D. C., Oct. 2, 1908.

ceding the need for this work. The intelligent consumer is by this time asking his dairyman when he had his cows tested and whether he is quite sure that they were all tested.

The miscellaneous scattered work has been gradually increasing over the state but a careful estimate will always show that but a very small percentage of the entire cattle in any large neighborhood have been tested. Purchasers of breeding cattle soon begin to inquire whether the prospective purchase has been tested or whether the owner will sell subject to test. A few herds are advertised guaranteeing freedom from tuberculosis. Municipal public opinion is by this time generally supporting the idea of city work, and public opinion in general is calling rather blindly for something more general and more effective, something on a larger scale, but with a very vague idea of what that something may be.

State dairy associations and live stock breeders' associations soon begin to pass resolutions calling for the testing of breeding cattle. And the principle of reimbursement is quite firmly established.

Up to this point—and this is where we are at present in the few states which are most advanced with bovine tuberculosis—the work has not usually been conducted on any comprehensive or well organized plan that can possibly lead to eradication or to a positive control. Herds that have been tested have not been wisely retested, if at all. Stables in which testing was done have been poorly disinfected if, indeed, thorough disinfection has been attempted. Stables from which tuberculous cattle have been removed have often been commonly refilled with untested cattle.

I believe that Minnesota has done as much effective work as any other state in the union, but our work is open to this same criticism of lacking permanence and of incompleteness. We are using a large quantity of tuberculin—and testing a large number of cattle in comparison with other states. Several other states are doing a considerable amount of tuberculin work, but

as the small boy expresses it, we are not getting anywhere. There is no finality about it. We are not getting to the end of the road.

Public sentiment in Minnesota, and perhaps in Wisconsin, Pennsylvania and other states is nearly or quite ready for some important development. There is no very clear idea as to what that development may be, for there are two things lacking, *first*, a comprehensive plan that has in it the possibility of an actual working out, and *second*, provision for financial support.

We have passed through a long period of preliminary training for the public and for those in charge of the work and several states are nearly ready for something different and better. The question is what that something may be. Before taking up this question as a problem to be solved let us see what individual states are already doing.

A STUDY OF INDIVIDUAL STATES.

From the list of states that have been doing serious work with bovine tuberculosis I have selected Minnesota, Pennsylvania, Wisconsin, and Massachusetts because these are pioneers. Their present laws and methods are outgrowths of years of experience. A study of these four will bring out all the important features and methods used in the United States.

The statements made under this heading are based upon the most recent and reliable authority which the author was able to secure. It may be that some states whose work is here discussed may have changed their procedure by the enactment of new legislation or otherwise, and hence possible errors in the present discussion are apparently unavoidable.

WISCONSIN.

The Sanitary Machine.—Wisconsin has placed her veterinary sanitary work with a live stock sanitary board consisting of three members of the State Board of Agriculture, the experiment station bacteriologist, and the State Veterinarian. The state veterinarian is appointed by the governor.

Board members serve without salary but are paid three dollars a day and expenses when in service. To this board is given the duty of protecting the health of domestic animals, especially against the serious infectious diseases. It has the usual authority to quarantine, kill, make regulations, and so forth.

This state has been making a special feature of public demonstration and educational work. Such demonstrations are frequently held at the agricultural college and at farmers' gatherings over the state. The Wisconsin station has also published a number of valuable bulletins on the subject of bovine tuberculosis.

Distribution of Tuberculin.—An interesting feature of the Wisconsin work and one which the writer has been watching with some curiosity has been the general distribution of Bureau tuberculin to parties making application. The Wisconsin experiment station in connection with the sanitary board furnishes tuberculin freely and gives instructions for testing to their agricultural students, short course students and others, and these are encouraged to do general testing.

Satisfactory information has not been obtained concerning the practical working of this method; but it seems quite certain that a state can hardly continue long to pay directly or indirectly, indemnity to owners on test so made, even though the records may be reviewed by the State Veterinarian's office.

An official statement published in 1908 gives figures for total tuberculin work. This report shows for the year 1905-6, 9,718 cattle tested, 17.7 per cent. reacting, and for 1906-07, 15,816 cattle tested, 8.1 per cent. reactions. During the year 1907-08, 40,993 cattle were tested with 5.6 per cent. reactions—a total of 66,527 with 8 per cent. of reactions. The total number of cattle tested in Wisconsin by veterinarians for the state during the year 1907-08 is 13,791. As there were a total of nearly 41,000 cattle tested in Wisconsin during the year there must have been about 27,000 unofficial tests by others using Bureau tuberculin furnished by the Experiment station. It is

thus seen that approximately two-thirds of the testing done in Wisconsin during the past year has been done by farmers' short course students, dairy course students at the agricultural college, and farmers in general.

Tuberculous Cattle.—The owner of condemned cattle is granted an option (1) of retaining animals under quarantine, or (2) he may ship them to an abattoir for slaughter under Federal inspection. In case he chooses the latter procedure, the owner receives the returns from carcass sale and has no further claim against the state. (3) If the owner does not choose either of these methods and the board deems it expedient to slaughter, the owner receives written notice. After a certain procedure, appraisal is had. The amount of appraisal is based upon the value of cattle in conditions as found, the limit being \$50. The board may then order such diseased animals shipped for killing to some point where federal inspection may be had.

It is ordered that the owner shall receive no compensation until the board is satisfied with the disinfection given the infected premises.

Wisconsin pays two-thirds of the appraisal, the amount to be expended not being limited. Assuming that the \$60,000 officially reported as paid for condemned cattle during 1907-08 was for the total 2,334 reactions, we have a showing of \$25.70 per head paid owners or \$25,700 per thousand cattle for reimbursement. The state receives for carcasses \$7,250 per thousand. Net reimbursement in Wisconsin was, therefore, \$18,450 per thousand.

A statement of the expense of office management in the experiment station's part of this work indicates a cost of \$103.75 per thousand cattle tested.

Results.—The census for 1900 gives the total cattle for Wisconsin as 2,314,000. From the best official information, Minnesota cattle have increased approximately 60 per cent. during the same interval, so that 40 per cent. is probably a conservative estimate for Wisconsin. On this basis the present cattle of Wisconsin would number about 3,240,000.

For a study of the amount of eradication work being done by the states that are leading in this work, suppose we take Wisconsin with her 3,240,000 cattle—not as a criticism, nor even as a special study, of Wisconsin; but as a general study. Nor does this study of Wisconsin work, or that of the other states here especially considered, take into consideration the splendid and absolutely necessary work in these and other states in the way of educating and arousing public sentiment. At the rate of testing done this year including the unofficial tests (two-thirds of the total) we have about 41,000 the highest record for one year. By process of simple division we find that about 80 years would be required to test once all the cattle in the state and one test accomplishes very little toward eradication.

Supposing that the plan of complete eradication is not undertaken and Wisconsin should attempt to test only her breeding herds and her dairy cattle. A Wisconsin official connected with this work estimates that there are at least 1,200,000 dairy cows in the state to-day. It would be foolish to test only the cows in any stable, so that it will be quite safe to bring the dairy herds up to 1,400,000. This, plus 64,800 pure breds, gives us 1,464,800 cattle to be tested including only the classes of cattle that are the worst and most immediate sources of dissemination. Testing 41,000 per year would require 35 years to test once these most serious sources of immediate danger.

I wish to repeat here, and very clearly, that these statements are not made in an unkind spirit or to belittle the work. Wisconsin deserves generous recognition as one of the pioneers in this field and for a large amount of work done as compared with the majority of other states.

MASSACHUSETTS.

Sanitary Machine.—In this state, authority for dealing with infectious disease of domestic animals is vested in a cattle bureau consisting of one individual, the chief. This bureau works in close connection with local boards of health through inspectors appointed by the local boards, and approved by the chief. The

Massachusetts law places the first responsibility for examinations, which are physical, upon these local inspectors. These inspectors are not trained veterinarians, but laymen.

Work and Method.—Tuberculin test work is divided into three classes:

(a) Examining cattle quarantined by local inspectors or reported by owners as suspected. These cattle are examined by proper agents who destroy or advise release of quarantine.

(b) Quarantine work and tuberculin testing with imported cattle.

During the year ending November 30, 1907, there was done under division "a" the following work:

There were quarantined 2,985 cattle. Of these 723 were released; 1,478 were condemned, killed, and paid for. Number condemned, killed, and in process of settlement, or otherwise disposed of 401. Of this item there were 10 killed with no post-mortem lesions found.

Work under class "b" for this same year shows that the cattle imported at Brighton numbered 84,677. Of these there were tested 14,480, the remainder being presumably cattle belonging to classes not subject to importation test. Of the tested, 169 were condemned and 49 others were killed on permit. There were released 14,262. In addition to these records for Brighton, official report shows that there were 7,238 additional cattle brought in for dairy and breeding purposes of which about one-third were tested before shipment and the remainder after arrival.

Massachusetts is doing a very large amount of herd inspection, the tuberculin test not being commonly used on Massachusetts cattle. The 8th semi-annual report, January, 1906, gives the total for the year of 32,760 herds inspected; total animals inspected 230,140, including 143,300 milk cows. I did not find a statement as to the number of animals so condemned; but very low pay is given these lay inspectors, in some of the smaller towns, \$15 to \$20 per year, hence it is hardly conceivable that

these inspectors are doing efficient work even in the way of physical examination.

Tuberculin test is imposed for imported dairy and breeding cattle. Beef cattle for slaughter, calves under six months of age and export cattle are exempt from test. Some testing is done for owners upon applications.

Expenditures.—The following items are given in round numbers and for the year ending November, 1906. The total available for all veterinary control work was \$95,854. In this there is included \$18,854, balance of a special appropriation for deficiency in 1905 accounts and appropriations for 1907 work \$77,000. Of this total there was expended \$89,337. There were unpaid balances and accounts at the end of the year sufficient to leave a deficit of nearly \$3,500. These funds were expended in part as follows:

- (1) Total salaries \$20,232, excluding special agents and expenses for glanders work.
- (2) Employees expenses, \$9,896.
- (3) Paid for condemned cattle, \$42,326.

Some portion, probably small, of items 1 and 2 should evidently be charged to glanders and other live stock sanitary board work. The office expenses including salaries of chief, clerks, and assistants, and miscellaneous office expense amount to \$6,960.

The officer in charge has estimated for the year ending 1908 for \$77,000 to cover all veterinary control work. \$7,000 of this is for office salaries and expenses and \$70,000 for general outside work. The maximum allowance for tuberculous cattle is \$40; average for several years is something less than \$21.

Results.—The chief's personal estimate of results is to the effect that inasmuch as Massachusetts is killing a few more on physical examination each year there is probably being accomplished but little in the way of decreasing prevalence; and that they are simply killing cattle that are of special menace to human health.

PENNSYLVANIA.

Organization.—Pennsylvania has a state live stock sanitary board consisting of the governor, secretary of agriculture, dairy and food commissioner, and state veterinarian. The state veterinarian is *ex-officio* a member and presumably executive officer of the sanitary board and at the same time reports as state veterinarian to the secretary of agriculture, which makes this organization somewhat confusing to an outsider.

Apparently the arrangement is to the effect that control work with infectious diseases which involve the community as a whole, and dealings with owners of such diseased stock and with owners whose stock is not yet affected are under the sanitary board. Whereas, subjects relating to the health of animals and sanitary work in general aside from work with infectious diseases, falls upon the state veterinarian as an officer in the department of agriculture rather than upon the sanitary board. The state veterinarian apparently acts in dual capacity as executive officer for the sanitary board and as state veterinarian in the department of agriculture.

Method.—Dairy and breeding cattle are imported subject to tuberculin test at the expense of the owner.

The Pennsylvania work with tuberculosis is apparently based to a considerable extent upon the theory that owners realize the seriousness of the question and that they will gladly co-operate if fairly treated, desiring to eradicate.

If an owner wishes to have cattle tested, he makes application to the sanitary board. In order to secure this assistance, he must agree to aid in the examination; to quarantine reacting animals promptly; to disinfect stables; and to improve the stable sanitation if directed to do so.

Application for test from owners whose cattle are not known to be affected, may be granted with the owner paying the expenses of test. Official reports are to the effect that so many applications are received that they can not all be granted with present available funds. An attempt is therefore made to confine the work to the worst infected herds.

When cattle are tested under application from the owner, he must agree to retest at his own expense within eight months providing one-fourth of the original herd is found to be tuberculous. He also agrees that he will not add untested cattle to his herd thereafter.

An interesting feature of the Pennsylvania work is that when cattle are killed for beef and incidentally found tuberculous to an extent which condemns the carcass for food purposes, the carcass may then be appraised and paid for by the state at a price not exceeding \$25 for the entire carcass.

When an owner has cattle inspected by a veterinarian at his own expense and finds some animals diseased, he may apply to the state for assistance in disposing of the cattle that are tuberculous and receives practically the same help in practically the same way as though cattle were tested at state expense.

When Pennsylvania cattle have reacted in the course of state work as already outlined, they may be disposed of in different ways. (1) Such cattle may be first appraised and then killed. Appraisal considers actual value and condition of the animals, the limits being \$25 for grades, and \$50 for registered cattle. Owners receive the full amount of appraisal which, however, must not exceed three-fourths of the actual value at time of slaughter. The owner receives the carcass salvage in addition to such appraisal and the cattle are killed under inspection. (2) Reacting non-clinical cattle may be retained under certain restrictions presumably for use according to the Bang system. It is stated that owners rarely use this permission.

An interesting provision is made for co-operation between the sanitary board and municipal authorities. When a municipality arranges for tuberculin test of herds supplying city trade, the state board is permitted to bear one-half the cost of such work in case of herds kept beyond jurisdiction limits of the local board of health.

Amount of Tuberculin Work Done.—Pennsylvania uses tuberculin made in her own sanitary board laboratory. During

the year 1905 there were distributed about 20,230 c.c. of tuberculin. The laboratory sent out 19,880 c. c. of tuberculin in 1906. We will estimate that this was all used, which would be a very generous estimate for Minnesota. The dose of this varied from 0.25 to 0.4 c. c. Estimating an average dose at .33 c. c. there were probably about 60,000 cattle actually tested. The writer was unable to find an accurate statement on this point in the official reports.

For this fiscal year, 1905, the board had available a total of \$45,000 for general control work. Of this amount there was expended for reimbursing owners and inspecting cattle for tuberculosis about \$29,500. For the year 1905 with the same total appropriation available for control work, the state spent \$27,230 for reimbursement and inspection work in connection with this disease. For the year 1904 the sanitary board had available for work \$45,000, of which there was spent \$31,766 for reimbursement of owners and expense of inspections. During the year 1905 there were condemned 1,352 cattle from 773 herds inspected. During the year 1906 there were condemned 1,536 cattle from 858 herds inspected.

Please bear in mind that we are not now studying results accomplished in the way of public education and enlistment of public support. These studies of methods and results in the four states selected are presented that we may have a clear view of the amount of field work done with cattle and stables. A further purpose is to show the need for comprehensive plans and large appropriations, and cold figures are more reliable than rhetoric as guides for judgment.

Results.—The census of 1900 gives a total of 2,000,000 cattle, of which there are 1,062,000 dairy cows over two years of age, and an estimated 40,000 pure bred cattle, or a total of 1,102,000.

We have estimated the total number of Pennsylvania cattle tested during 1906 at 60,000. Tests of recently imported cattle should not be included in this estimate. This number tested

when compared with the total number of cattle in the state about 2,000,000 indicates that 33 years would be required at this rate for testing all cattle in the state; or on a basis of 1,022,000 dairy cows and an estimated 40,000 pure bred cattle or a total of 1,062,000 dairy and pure bred cattle to be tested there would be required for these classes at this rate of testing 17 years for one test of each herd. One test, even though followed by disinfection, accomplishes comparatively little in the way of eradication. It will, therefore, be seen that Pennsylvania, one of the leaders in this work in the United States, is like other states really accomplishing very little in the way of eradication or actual control.

MINNESOTA.

The Machine.—Sanitary control work in Minnesota is in charge of a live stock sanitary board consisting of five members appointed by the governor. Three members must be financially interested in the maintenance of live stock and two members must be veterinarians, graduates of recognized colleges. The secretary and executive officer as well as field veterinarians and other assistants are employed by the board without any political oversight. It is provided by law that the secretary must be a graduate from a reputable veterinary college. One board membership becomes vacant each year. Board members receive no compensation except actual traveling expenses.

This board meets quarterly for consideration of work accomplished, to plan future work, and consider proposed regulations. The secretary is an executive officer carrying out plans of the board and provisions of the law. The legal basis for this work and powers bestowed upon this board are very broad so that the board should rarely or never be hampered by lack of authority to a given work. Apparently the only probable source of failure in a board so organized must lie in sheer incompetence of board members. Thus far there has been described only the central control power of a great machine, for which this state board there is intimately associated by law

2,500 local boards of health and health officers who have certain prescribed responsibilities in connection with this state work and who are subservient to the state board.

Features of the Law.—It is the legal duty under penalty for anyone who knows of or suspects existence of any infectious disease to report this to his local health officer and he within 24 hours to the state board. In case of animals to be killed the owner is given all reasonable protection in the way of protest, appraisal, reimbursement, etc., but the protest does not delay killing.

For veterinary control work Minnesota uses, and we much prefer, the plan of employing field veterinarians on full time and for the exclusive service of the board. This plan is chosen rather than that of deputy or local state veterinarians who are engaged in private practice and frequently embarrassed in performance of state duty by reason of private practice jeopardized, and by lack of special training and large field experience. There are many reasons which the writer believes to be good, which may be advanced in support of this plan.

Minnesota forbids importation of cattle for dairy or breeding purposes except under tuberculin test. The penalty for violation of this is quite severe, being not less than \$500 nor more than \$1,000 or imprisonment for not more than one year.

Minnesota has had for years a law which provides for the pasteurization of creamery skimmed milk. Sour milk has proved a very serious source of dissemination for other states that have no such legislation.

Disinfection and Refilling.—It is expressly ordered by regulations that when cattle are tested and diseased animals are removed and paid for, the owner must disinfect the stables in a prescribed manner and must not put any untested cattle into such stables. Violation of this regulation forfeits claim for future reimbursement.

Method with Tuberculosis.—The general plan with tuberculosis is as follows:

Testing may be done by certain veterinary representatives of a state or local boards or by any graduate veterinarian recognized by the state board for this work. When reacting cattle are found, such cattle are appraised on the owner's premises. They are then shipped to some convenient point within the state where there is federal inspection and are there killed under such inspection. If no tuberculosis is found, the owner receives full appraisal, which must not exceed \$75 for registered cattle or \$35 for grades. Carcasses are disposed of to the best possible advantage and the carcass returns or salvage goes directly to the owner, who is paid in addition by the state three-quarters of the difference between appraisal and carcass salvage.

A large amount of tuberculin test work has been done in Minnesota and a large number of tuberculous cattle have been disposed of—large numbers when we consider them in the abstract or compare with other states, but very small as will be shown later in proportion to the total amount of work to be done. The actual amount of work done together with a study of the results, expenses, returns, etc., is presented in the following table:

Tuberculin Work for the Year Ending August 1, 1908.—Registered cattle, tested 1,329; number of reactions 490 or 36.8 per cent.

Number of reacting animals killed 428; number of carcasses passed 199 or 47 per cent.; number of carcasses condemned 229 or 53 per cent.

Appraised value of 428 cattle \$27,770.50; average about \$64.

Carcass returns \$5,296; average \$13.37.

Owners received from the state in addition to carcass returns \$16,795; average \$39.20 per head.

For all registered cattle appraised in addition to this, the state spent for freight and yardage \$666.

The total net cost to the state for reimbursement, freight, yardage, etc., was \$17,460; or average for all killed \$40.80.

Grade cattle, number tested, 25,887; reacted, 2,000, or 7.7 per cent.; number killed, 1,941; of these there were inspected 1,797; carcasses passed 851, or about 47.3 per cent. of carcasses inspected; carcasses condemned 946, about 52.7 per cent. of carcasses inspected.

Killed without appraisal 144.

Killed with no lesions found on inspection, 52 animals, about 2.7 per cent. of killed.

Total appraisals \$51,027; average \$26.23.

Total carcasses returns \$17,054; average carcass salvage \$8.79.

Paid owners in addition to carcass returns including full appraisal for the 52 animals about \$25,820.

Freight and yardage \$1,784.85.

The total expense to the state for reimbursement, freight, and yardage for grade cattle was \$27,605, averaging for all grades killed \$14.20. Note that this total cost to the state is the merest trifle over \$1 per head for all grade cattle tested.

The average percentage of reactions for animals tested regardless of breed was 9.3 per cent.

Dr. Melvin has recently reported records of 400,000 tests made during the past 15 years in various portions of the United States and by various authorities. This shows 9.25 per cent. reactions, the average for all breeds and conditions represented. Note two points: (1) the close agreement with the Minnesota average for the past year 9.3 per cent. for all classes.

(2) That only 400,000 recognized tests seem to have accumulated in the past 15 years in the United States. Minnesota alone has about 3,000,000 cattle.

It is estimated that 41 per cent. each of the office salaries and expense; field veterinarian salaries; laboratory expense and 30 per cent. of total travelling expenses may be charged to tuberculosis work under the present Minnesota plan.

Study of Minnesota work shows the following summarized data for the cost of such work:

Cost of office work per thousand tested \$70.20.

Total cost to the state for tuberculosis work per thousand *registered* cattle tested; reimbursement, freight, and yardage \$13,137.

Net cost to the state per thousand *grades* tested for reimbursement, freight, and yardage \$1,067.

Appraisal per thousand registered cattle \$63,940.

Appraisal per thousand grade cattle \$26,230.

Carcass salvage per thousand registered cattle \$13,370.

Carcass salvage per thousand grade cattle \$8,790.

Net cost to the state for reimbursement per thousand registered cattle tested, paying three-quarters of the difference between appraisal and carcass salvage, \$12,637.

Net cost to the state for reimbursement per thousand grade cattle tested, paying three-quarters of the difference between appraisal and carcass salvage, \$997. Note the relatively great expensiveness of this work with registered cattle.

Financial Statement.—Minnesota during the present bi-ennium has available \$130,000 exclusively for work with tuberculosis and glanders. As before stated, it is estimated that 41 per cent. of the total office and field veterinarians' salaries may be charged to tuberculosis and 30 per cent. of the total travelling expenses. The sums paid in reimbursement for tuberculous cattle during the past year have already been given.

Results and Present Situation.—It is stated on good authority that there is not an untested herd of pure bred dairy cattle in the state. A considerable proportion of the other breeding herds are reported as tested one or more times. We have 12 cities with tuberculin test ordinances in effect or which will very soon be in operation.

Our cattle breeders are becoming very cautious about buying untested cattle. The state dairy association at several annual meetings during the last few years has endorsed the tuberculin test without a dissenting voice and called upon the legis-

lature for legal provision whereby stock sold for breeding purposes must be sold with tuberculin test or subject to test.

Of the special features of Minnesota's law and methods there may be summarized the following:

There is a peculiar organization of the sanitary board, previously described. There is a fairly comfortable financial situation with \$130,000 for the last bi-ennium exclusively for glanders and tuberculosis, \$172,000 for all work for the board.

There is a close organization of local health officers and township supervisors with the central board. There is concentration of energies and funds on dairy and creamery herds, and pure bred cattle, the most serious factors in disseminating the disease among other cattle and most threatening to people.

A hasty survey of the figures for work in Minnesota as in other of the few states that are doing considerable work with tuberculosis gives the impression that the state is doing a great work, and so it is, when we consider that as such problems and movements go, this work is young. But when we consider work already accomplished or that can possibly be accomplished by our present methods and funds in the light of the entire problem the amount of work done in Minnesota is trivial. To illustrate this, let me suggest that we have a total of nearly 3,000,000 cattle in the state of which there are 590,000 creamery and city dairy cows and about 60,000 pure bred cattle. In these classes alone the most serious classes, we have 650,000 cattle.

At the present rate of 27,216 cattle tested officially last year it would require about 24 years to test the dairy and breeding herds alone or 111 years to test all the cattle in the state. Testing infected herds at intervals of five years or even two years for instance would accomplish very little toward eradication, as every experienced veterinary sanitarian well knows. Testing only these most important classes of cattle once in 24 years is accomplishing nothing so far as eradication or effective control work is concerned. We are simply removing a small proportion of the infected cattle capable of disseminating infection.

Think of the 142,000 farm cattle barns in Minnesota and 3,650 other barns containing cattle in the state, any of which are possible sources of infection, and worst of all, we do not know which herds and which stables are disseminating this infection.

GATHERED FROM STUDY OF INDIVIDUAL STATES.

There appears to be very much to criticise in the best work of the best states so far as actual results are concerned, and many things worthy of praise in the poorest—if we consider age of the work, time, conditions and opportunities. This study of individual states forces certain conclusions:

It is apparent that the most important among results thus far actually accomplished toward efficient control of bovine tuberculosis has been in the way of public education and the enlistment of a favorable opinion.

(1) The work with cattle and stables is fragmentary, unsystematic, and accomplishing little in the way of permanent results, but is perhaps the best that could be reasonably expected up to this time.

(2) The best field work being done leaves untested and unprotected a large proportion of the most important classes of cattle and a large amount of testing is being done with herds capable of doing little harm.

(3) Available appropriations are very small if we consider human lives and live stock interests to be protected.

It should be remembered in considering justification for large appropriations that the live stock interests are not the only ones involved in live stock sanitary work, even if we consider only the financial side of the problem and ignore the question of human health.

The writer recently heard a large wholesale merchant state in public that jobbers always feel safe in extending large credits to merchants in farming districts where there was plenty of live stock. When we are protecting live stock interests we are protecting to a very important extent the entire commerce of the state or nation.

(4) In order that generous appropriations may be had, it is absolutely necessary that the live stock sanitary control work should be efficient and should be managed with the most scrupulous economy and honesty and fair treatment so as to gain and retain the confidence and support of the stock owner and influential public in general.

(5) In order to plan work on a large scale and get results, appropriations must be more stable. A standing annual appropriation upon which a board may depend is to be preferred over larger but uncertain appropriations. This great sanitary problem can never be solved by any temporary measure. Work of permanent value must extend through a term of years. This problem will never be solved in any satisfactory way until it is possible to plan work for years in advance and with the understanding that plans may be carried out.

(6) Tuberculin test work which may entitle the owner to reimbursement should be done by veterinarians and their returns accompanied by an affidavit showing definitely just how the test was made and who did it. The sanitary authorities should have a rigid rule concerning tuberculin test that will be accepted and that rule must be enforced even though in some cases features of the rule may appear to be useless and unnecessarily troublesome.

States doing serious work with tuberculosis have had quite enough trouble with tuberculin tests done by veterinarians who know how the work should be done. It does not appear wise to extend this trouble by throwing such work wide open to students and farmers in general with the state to pay for cattle condemned on such basis even though some veterinary officer does look over the test records.

(7) The writer is convinced after this study of the work of individual states that the ideal state organization for this control work consists of a board of about five members, a majority of whom should be ex-officio. The secretary and executive officer should be a graduate veterinarian and employed by

the board from outside its membership. The board should be composed of veterinarians and prominent owners of live stock. The members should serve without compensation or opportunity for remunerative employment by the board. The veterinarians and live stock memberships in their influence on the board and considering the secretary, should be fairly balanced. I would not have such a board composed exclusively of either veterinarians or live stock men.

This board should be in close organization with all local health officers and boards of township supervisors of the state.

Professional politicians should be entirely eliminated, which is not difficult. This board must have ample authority and should be closely organized in connection with all of the local health officers and township supervisors of the state. Its appropriations must be large and stable.

ERADICATION.

We frequently hear intelligent people say that all this tuberculosis work is wrong. They say: "You must test all the cattle in the state and eradicate the disease, and that is the only businesslike thing to do." Sweeping plans have been proposed for eradication; but those who propose them do not appear to have had a close view of the great difficulties in the way of actually carrying out such propositions.

The problem of tuberculosis eradication is a very different one from the federal pleuro-pneumonia work of some years ago which cost only the mere trifle of \$1,500,000 and five years' time and involved but six states.

The eradication of foot and mouth disease cost less than \$300,000, including about \$129,000 indemnity paid to owners of cattle. Those tasks were but as child's play and relatively trivial in expense as compared with the work of eradicating tuberculosis from the United States. These two sums com-

bined would be small in comparison with the cost of eradicating tuberculosis from Minnesota or Wisconsin, or Pennsylvania, or any one of a large number of states.

It is easy enough to insist on complete eradication and say away with tuberculosis, but when one familiar with this class of work sits down to figure, he is appalled by the way figures run into the millions. And even if an unlimited amount of money were available there are other and almost insurmountable difficulties in the way of complete, rapid eradication under present conditions. To illustrate this the writer will present a careful estimate as to the expense of so eradicating tuberculosis from a single state. Let us use Minnesota for a study of the general problem—and as a national problem.

Basis of Calculations.—Calculations are based on the following standards:

Testing all cattle in the state twice a year for two years and annually for the next five years; stable disinfection after each test; reimbursement to owners of one-half appraisal—owner to receive in addition the carcass salvage.

The appraisal limits are \$75 for pure breds, \$35 for grades; average appraisal for pure breds \$60, and \$26.25 for other cattle; average carcass salvage for registered cattle \$13.37; other cattle \$8.79.

There are about 2,993,600 cattle in the state of Minnesota. Two per cent. of these or 59,872 are estimated for pure breds; total dairy cows over two years of age 590,728.

Our Minnesota records show about 37 per cent. of reactions for pure breds, other cattle 7.7 per cent. For this present computation the pure breds are placed at 15 per cent. reactions, dairy and creamery cows at 4 per cent., other cattle 3 per cent. for the first test and all classes at .75 per cent. reactions for subsequent tests. Pure bred cattle are valued at an average of \$60; creamery and dairy cows at \$35; other cattle at \$20.

Expense of office management for the past year in Minnesota during which 27,216 cattle were tested officially, was about \$70.20 per thousand tested. Of this \$70, \$34 was for clerical work and general office expenses. This item would continue nearly a level rate even when dealing with very large numbers of tests. The other item of \$36 for executive salary would not increase with the amount of work, but would practically disappear as insignificant in the general rate per thousand. \$35 per thousand tests is therefore used as the rate for expense of office management. The best available figures for neighboring states is \$103 per thousand.

Average cost of disinfection per barn \$13 and the barns averaged is 1900 according to census, 13 cattle each.

Cost of test is based on the following:

Veterinarians employed on full time for testing are put at \$1,200; helpers \$600. Each pair (one helper and one veterinarian) is allowed to keep one horse at state expense, which is estimated at \$150 per year per horse; aside from this, they pay their own expenses. Each pair is to make three tests per week, averaging in all sections of the state 25 animals per test or 75 per week. Enough veterinarians are to be employed for the first two years to test all cattle in the state once in six months. The number of cattle is supposed to remain stationary. After the first two years, one-half as many veterinarians are employed so as to test annually.

Objection to these calculations may be raised on the ground that it would be unnecessary to test all herds semi-annually for the first two years. True, there would be a rather large percentage of herds showing no reactions on the first general test. But we have no reliable basis upon which to estimate this percentage. If we could make this correction but one item in the following list "cost of testing" would be varied, and the general conclusions would not be affected in the slightest degree.

Computing on these basis we obtain the following startling figures as to losses expenses of an active and reasonably thorough eradication work:

Total Value of All Reacting Cattle.

For the first year.....	\$3,289,502 00
For the first two years.....	4,527,172 00
For the seven years.....	7,121,847 00

Total Net Loss to the Cattle Interests of the State, i. e., Valuation of All Condemned Cattle Less the Carcass Salvage.

For the first year.....	\$1,968,430 00
For the first two years.....	2,492,283 00
For the seven years.....	3,931,844 00

Net Loss to Owners for All Classes of Cattle.

During the first year.....	\$965,204 03
During the second year.....	1,264,988 71
During the seven years.....	2,014,447 92

Cost to the State (Reimbursement), All Classes of Cattle.

For the first year.....	\$650,897 23
For the first two years.....	898,021 51
For the seven years.....	1,515,831 21

On the basis previously given the cost of testing all classes of cattle by veterinarians and helpers would amount:

For the first year.....	\$1,893,450 00
For the first two years.....	3,786,900 00
For the seven years.....	8,520,525 00

Suppose it is held that this required number of veterinarians is not available, which is quite true, or that it is unnecessary to employ such expensive men to do the work. By employing farm school students, dairy school students, farmers' short course students and others, which procedure experienced sani-

tarians would hardly approve, we find that the cost of testing all cattle as before would be:

For the first year.....	\$2,019,666 00
For the first two years.....	4,039,332 00
For the seven years.....	9,088,497 00

Cost of Disinfecting All Stables.

For the first year.....	\$4,686,000 00
For the first two years.....	9,372,000 00
For the seven years.....	21,087,000 00

Cost of Office Management at \$34.00 per Thousand Tests.

For the first year testing all cattle.....	\$203,564 00
For the first two years.....	407,128 00
For the seven years.....	916,038 00

Amount of Tuberculin Used B. A. I. Standard for All Cattle.

During the first year 11,974 litres, or approximately 2,994 gallons.

During the first two years 23,949 litres, or approximately 5,987 gallons.

Total for the seven years 54,885 litres, or approximately 13,471 gallons.

During the past year the government distributed a total of 259,100 c. c. tuberculin, which cost the government to produce about \$10 per litre.

To test all the cattle in Minnesota alone on this plan for the first year would require 46 times this entire federal output.

The cost of producing tuberculin needed on this plan would be:

During the first year.....	\$119,740 00
For the first two years.....	239,490 00
For the next five years.....	299,350 00
Total for the seven years.....	538,840 00

Total expense for veterinary services, disinfection, reimbursement, office management, and including the cost of producing tuberculin which could perhaps be produced by the state at about the same expense as by the government:

For the first year.....	\$7,553,650 00
For the first two years.....	14,703,540 00
For the seven years.....	35,004,260 00

The total value of all Minnesota cattle in 1900 was \$37,197,198. The present value of Minnesota cattle is probably about \$50,000,000. These figures give a careful estimate as to the actual cost of rapidly eradicating tuberculosis from one state.

The total annual expenditures for all purposes by this state amount to about \$6,500,000. Eradication work on this basis during the first year would require considerably more than the entire available resources of the state that year. Can there be any question concerning the hopeless impossibility of rapid eradication under present conditions and with present available agencies? Nor may we reasonably expect complete eradication in the near future. But if absolute eradication, which would be ideal, is unattainable, is it not the part of wisdom to content ourselves with the best work that may be within the limits of reasonable possibilities?

Eventually there will come a time when public sentiment will support thorough and careful work and when sufficient funds may be secured to carry on large work. We may yet have a cheap, safe and efficient vaccine and when other aids unknown at present may then be available. But we must not wait for public sentiment and other conditions to be entirely favorable before making a beginning. The progressive sanitarian must always work somewhat in advance of public sentiment, meanwhile doing his part toward a wise development of public information along intelligently progressive lines.

Solid Ground in Sight.—Thoughtful students of this problem are beginning to ask the question "What next?"

Those engaged in this work have been wading through an unknown slough for something like fifteen years and we are beginning to feel that we have found some spots of good firm ground. There have been developed certain general principles upon which we may base future work.

So far as we can see now, it is evident that comprehensive plans for dealing with the bovine tuberculosis problem must be based upon tuberculin test.

Tuberculin is firmly established as a reasonably accurate diagnostic.

Tuberculosis is now recognized as a serious menace to human health and as an actual source of danger and a constant threat to livestock financial interests.

It is well established that this is not a disease of breed or type, and we are probably well acquired with the sources and methods of spread.

The principle of indemnity is apparently established as a necessary preliminary procedure.

It is clearly established that one tuberculin test and one disinfection can not be depended on to eradicate tuberculosis from an individual stable and we must plan with this in view when attempting to do thorough work. The classes of cattle which are most actively spreading the infection should be tested first and this means city dairy cattle, creamery herds and pure bred herds.

The first retest of reacting herds should be given in about six months and there should be preferably semi-annual tests for the first two years and thereafter annual test as needed.

There must be adequate disinfection after each test where reacting animals are found.

Stables must be refilled with tested cattle only, or the owner should forfeit his right to future indemnity. There must be used some reliable system of marking that will obviate the probability of fraud.

It is quite clear also that we must have the co-operation of owners and the support of public opinion before anything effective can be accomplished. On the other hand, it will not do to wait for this before making an active start in the work.

Ideal state work employs field veterinarians on full time and in exclusive service rather than deputy or assistant state veterinarians engaged in private practice.

Importation of cattle for dairy and breeding purposes to a state that is undertaking any serious tuberculosis work should be only under the guarantee of a competent tuberculin test.

We must take up the most serious and urgent problem in order and the work must continue to be something of an evolution.

A PROPOSITION FOR CONTROL WORK.

After a careful study of this problem extending over quite a period, the writer is disposed to suggest a program for dealing with the problem of bovine tuberculosis control.

It is unquestionably desirable to locate by tagging or otherwise and deal only with infected herds, but the practical possibility of this on the needed scale has not been demonstrated. There are very difficult problems and complicated details yet to be worked out.

Assuming that a state has a good law and an effective sanitary machine, both having the qualities and features already outlined, I submit the following to be taken up in the order given:

(1) In the early history of control work with tuberculosis all resources of energy and money should be concentrated as closely as possible upon importations, dairy and creamery herds, and pure bred herds. Whenever public sentiment and available funds may justify more thorough work, there should be undertaken what may be as nearly as possible eradication of tuberculosis from these three classes of cattle.

(2) The first compulsory testing should be of all herds from which milk is offered for sale in the cities, towns, or villages.

With suitable provision for retesting, refilling with sound cattle, and proper disinfection of the stable.

(3) All cattle sold for breeding purposes should be sold with certificates of test or subject to test under such wording of the law as will protect the purchaser against fraud. Compulsory test of all cattle in breeding herds would, of course, be preferable, but there might be question whether it is feasible to force the test for breeding cattle not actually on sale and so long as the cattle remain in the present owner's herd.

(4) Compulsory testing of all creamery herds may come third providing the state has effective provision for pasteurizing creamery skim milk. This should imply suitable retesting, refilling and disinfection.

(5) Cattle imported for dairy or breeding purposes must come in with satisfactory certificate of test forwarded to the secretary of the sanitary board or cattle should be held at the first suitable point within the state for testing. Testing imported cattle should be done at the owners expense and every possible precaution taken to avoid fraud.

Heavy fines must be imposed upon violators of this provision and the penalty should fall upon either or both the owner and transportation company.

(6) All official testing should be done by veterinarians who are definitely listed and recognized by the sanitary authorities.

The sanitary authorities should define fully and in detail just what constitutes a tuberculin test which will be accepted and every test record should be accompanied by an affidavit from the one who signs the test records; which affidavit should specify just what and how much the affiant did in connection with the test.

FINANCIAL STATEMENT.

A series of computations have been made in order that we may have a clear view of the probable cost of eradication from city dairy, creamery, and pure bred herds. Knowing approximately the cost, we may more intelligently consider the feasibility

ity of undertaking the work, let it be clearly understood that the following is offered as so much data, so much information that may be useful, and not as work and expense which states are now advised to undertake.

The bases for calculation are the same as for those previously used in studying the possibility of complete eradication.

VALUE OF REACTING CATTLE IN THESE CLASSES.

City Dairy and Creamery.

First year	\$982,065 00
First two years.....	1,292,165 00
For seven years.....	2,067,415 00

Pure Breds.

First year	\$639,882 00
First two years.....	1,041,950 00
For seven years.....	1,547,120 00

Total for Both Classes.

First year	\$1,621,947 00
First two years.....	2,334,115 00
For seven years.....	3,614,535 00

TOTAL NET LOSS TO CATTLE INTERESTS OF THE STATE.

(Total healthy value of condemned cattle minus carcass salvage.)

CREAMERY AND CITY DAIRY.

First year	\$660,670 00
First two years.....	738,557 00
For seven years.....	933,276 00

Pure Bred Cattle.

First year	\$519,808 00
First two years.....	571,789 00
For seven years.....	831,693 00

Total of Both Classes.

First year	\$1,180,478 00
First two years.....	1,310,346 00
For seven years.....	1,764,969 00

NET LOSS TO OWNERS.

Pure Bred Cattle.

First year	\$219,667 88
First two years.....	240,588 63
For seven years.....	292,890 50

Creamery and City Dairy.

First year	\$227,895 66
First two years.....	299,704 80
For seven years.....	497,222 65

Total of Both Classes.

First year	\$447,563 54
First two years.....	540,293 43
For seven years.....	772,113 15

NET COST TO STATE FOR REIMBURSEMENT.

Pure Bred Cattle.

First year	\$209,387 00
First two years.....	230,326 00
For seven years.....	282,672 00

Creamery and City Dairy Herds.

First year	\$176,282 00
First two years.....	242,388 00
For seven years.....	407,652 00

Total of Both Classes.

First year	\$385,669 00
First two years.....	472,714 00
For seven years.....	690,324 00

COST OF TESTING.*Cost of Testing by Veterinarians—Creamery, City Dairy, and Pure Breds.*

First year	\$650,175 00
First two years.....	1,300,350 00
For seven years.....	2,925,787 00

The number of veterinarians required for the first two years would be 333 and for the next five years 167.

If it is argued that there are not enough veterinarians available for this work at the proposed salary and that the work could be done by graduates of agricultural colleges, short course students, dairy course students, etc., then the calculation and testing would be as follows. The author would not approve of this method; but will submit the calculation.

Cost of Testing Creamery, City Herds and Pure Breds.

First year	\$550,150 00
First two years.....	1,100,300 00
For seven years.....	2,475,675 00

COST OF DISINFECTING STABLES.

This is on the basis of 50,000 barns for city dairy, creamery, and pure bred herds which is very nearly correct for Minnesota.

First year	\$650,000 00
First two years.....	1,300,000 00
For seven years.....	2,925,000 00

COST OF OFFICE MANAGEMENT.

(For creamery, city dairy and pure bred cattle at 34 per thousand tests, possibly high for work on large scale.)

First year	\$44,200 00
First two years.....	88,400 00
Seven years	198,900 00

AMOUNT OF TUBERCULIN USED AND COST.

Creamery, City Dairy and Pure Bred Cattle.

First year about 2,600 litres or 650 gallons, costing.	\$26,000 00
First two years 5,200 litres or 1,300 gallons, costing.	52,000 00
For the seven years 11,700 litres or 2,925 gallons, costing	117,000 00

TOTAL COST OF ERADICATION.

These figures indicate that the total cost of eradication in seven years on this basis and from these classes, city dairy, creamery, and pure bred herds would be as follows:

First year	\$1,756,080 00
First two years.....	3,213,460 00
For the seven years.....	6,857,000 00

Data.—It is interesting to note in this connection that on this basis there is required .5 of a gallon B. A. I. tuberculin per thousand cattle, per test.

Testing by veterinarians would cost on the basis previously given very nearly \$0.50 per head. Testing by farm school graduates, etc., would cost about \$0.43 per head.

The cost of disinfection on the basis given amounts almost exactly to \$1 for each animal tested for each disinfection.

It is possible that some more economical plan for utilizing tuberculous cattle than by slaughter and carcass salvage may be developed.

This may come with tuberculosis stock farms under private management licensed by the county or state; or possibly with tuberculosis farms managed directly by the county or state. No difference what form this plan may assume, it is safe to say that it will receive a royal welcome after it has made good, as we say in American phrase.

In order to stand test, any plan for utilizing tuberculous cattle must answer favorably to one difficult question: Is it profitable in cold dollars? Can tuberculous cattle whether mixed

grades or pure breds of many breeds, be purchased at the average price of carcass salvage and then be managed profitably in the United States, with the products honestly labelled and competing in the open market with similar products from healthy cattle?

With this question in mind the writer has been unable to formulate anything that would stand careful analysis. Neither has any method suggested by others come under observation that does not appear hopelessly impracticable. Several have suggested plans, some features of which may yet be utilized, and we may all wish earnestly that something better may appear.

In Conclusion.—It need not be argued in this connection as to whether vigorous control work on a large scale should be done by the state alone or by the state with federal aid or whether by federal authorities chiefly. Abrogation of police powers of a state involves legal questions which need not enter into this discussion. But whether this final work of eradicating tuberculosis from these three classes of cattle is to be undertaken by the state alone or by the state with generous federal aid, it is very evident that the work must be done with individual states as units.

Hitherto there has been too much theorizing and too much guessing. Students of this problem have been dealing too much with glittering generalities. It seems high time for us to develop some tried bases for more efficient work; time for statements of basic principles and quite time to outline large plans. Our owners and consumers and legislators are entitled to practical plans and prosy statements of probable cost and probable results.

Let us all—all who are directly interested in this problem and familiar with it, endeavor to work out practical methods of doing much larger and much more efficient work than we have been doing.

“Still achieving; still pursuing.
Learn to labor, and to wait.”

IN Prussia the price of medicine is regulated by the state, a new price list being published every year.

SHIFTING LAMENESS.*

GEORGE R. WHITE, M.D., D.V.S., NASHVILLE, TENNESSEE.

When honored by the Secretary of the American Veterinary Medical Association with an invitation to contribute to this program, by presenting a paper that would be of interest to the general practitioner, I cast around for a subject which would be of most benefit to those fellow practitioners who would do me the honor to listen to the reading of the paper, or others who might chance to read same when published either in the printed proceedings of this meeting, or in the AMERICAN VETERINARY REVIEW.

The subject which I have selected appealed to me as one of sufficient importance and interest for presentation on this occasion. In this age of modern veterinary science the study of lameness in general, and special lameness in particular, is not receiving as much attention as it very justly deserves.

Lameness may be defined as pain or stiffness manifested by weakness or soreness in one or more limbs, associated with perverted function of the limb or limbs affected. The term "shifting lameness" is self-explanatory.

From the viewpoint of the practitioner of veterinary medicine, accurate diagnosis of lameness is the most difficult; however, the most important problem with which he is called upon to contend. It is always puzzling and is indefinite in many cases. Accurate diagnosis stands essentially for two things: Accuracy of observation based upon extensive practical experience, and the basing of conclusions on facts gleaned from the actual symptoms presented, rather than assumptions or "fine-spun theories."

We view with a degree of pride the advances in our knowledge of veterinary science. This pride is in a measure justified when we compare our knowledge of to-day with that of only

*A paper read before the 45th annual meeting, American Veterinary Medical Association, Philadelphia, Pa., September 8, 9, 10, 11, 1908.

a few years ago. But we are mistaken if we assume that veterinary medicine and surgery has already attained the rank of a perfect science, for we have as yet made only a few steps in that direction. This applies to physical diagnosis in particular, which, of course, includes lameness.

Unfortunately, the knowledge of lameness by the average general practitioner has lagged far behind many other branches of veterinary science. As an example may be mentioned veterinary sanitary medicine. We, as general practitioners, must freely admit, without hesitation, that most of the gifted members of the veterinary profession have deserted our ranks and entered the field of college or experimental station work, or the domain of sanitary veterinary medicine. They have been attracted to other fields of endeavor by attractive salaries and official positions with less work and worry than is encountered by the average general practitioner.

Of course, we must all admit that the opportunities for honor and achievement are greater with the man who chooses sanitary science or experimental medicine as a profession; however, it is a great misfortune that the ranks of the general practitioner are to be depleted by some of our best and most gifted men deserting us. Their advice and counsel is needed most where the darkness is greatest.

The trained diagnostician recognizes the fact that the location of lameness is one of the most tedious and difficult problems which daily confronts him. His reserve faculties are here constantly brought into action. It is here that his skill is subjected to the severest test. It is here that a mistake in diagnosis often causes embarrassment by inviting adverse criticism and uncomplimentary comment. It is here that reputations are quickly made, and it is here that they are more quickly lost. We must ever be on our guard in diagnosing lameness. One reason for this is that we do not sufficiently train our senses to the necessary keenness of perception. We are too often insensible to the distinction between facts and fancy in our observation,

and too quick in arriving at the conclusion. There is no subject more worthy of consideration, no time more fitting, no place better suited to the act, than the discussion now before the American Veterinary Medical Association of the subject of this paper—"Shifting Lameness."

It has been correctly suggested that the diagnosis of lameness is a triple problem, viz: I, Recognition of the Affected leg; II, Location of seat of lameness; III, Determination of cause or nature of lameness.

The treatment of lameness deserves secondary consideration, as that is often simple when once a correct diagnosis has been made. Of course, the prognosis in "shifting lameness" is always indefinite, as this depends altogether upon its etiology, or we might say the systemic disease which is always its forerunner. We must bear in mind the fact that shifting lameness—exclusive, possibly, of septic arthritis in foals—is not a sign of localized soreness, but it is a pathognomonic symptom of one of the following three systemic affections: Osteoporosis, Millet Disease, Rheumatism.

The stages of lameness may be classed as acute, sub-acute, and chronic. The stage must be established or determined from the history of the case. We will now briefly consider the pathology of the lameness producing lesions, of each of the three systemic diseases in which "shifting lameness" is a prominent and well marked symptom:

OSTEOPOROSIS.

The bone and joint lesions, which produce lameness in osteoporosis, are of a gradual, slow developing character. The disease causes absorption of the calcareous or compact bone substance, which, of course, leaves the bone in an impoverished, porous and weakened condition. It also attacks the articular cartilages of the joints—most often those of the hock, stifle and hip, of the hind leg, and those of the knee and elbow of the foreleg. The smooth, glistening surfaces of the affected joints be-

come rough and uneven, something similar to ulceration, with no pus formation. There is synovial distension and periarticular infiltration. The synovial and articular function of the joint is distorted to such an extent that the movement of the affected joint or joints causes friction, hence pain and lameness. The bones of the limbs rarely if ever become enlarged. The marrow is more vascular than normal. The synovia is thick and light brown in color and contains broken down debris from the ulcerated articular cartilages and bone. Occasionally a ligament or tendon may become detached at its insertion by tearing the periosteum from the diseased bone.

Shifting indefinite lameness, involving first one leg and then the other, is always suggestive of beginning osteoporosis. Of course, if the disease has advanced to the degree where the characteristic symmetrical swelling or thickening of the maxillary (superior and inferior) bones takes place, the diagnosis is easy. However, until the occurrence of this characteristic enlargement of the face and jaw bones the lameness from osteoporosis can easily be mistaken for that of either millet disease or rheumatism.

MILLET DISEASE.

In millet disease the bone becomes decidedly softened; however, there is no tendency to absorption of the calcareous or compact bone substance. There is a marked tendency to detachment of the ligaments and tendons at their insertion. They frequently tear away and carry bone substance and periosteum with them. There is a well marked, or, we might say, profuse, infiltration into the joints and tendon bursae; however, the supply of true synovial fluid is in all cases considerably diminished; in fact, in many cases its secretion is entirely suppressed. In cases where the synovial fluid is scant, adhesions of important structures sometimes occur. The disease has even produced ankylosis of one or more of the important joints.

The articular surfaces of the affected joints show numerous indentations of an ulcerative or softening character; of course,

these leave the joint in a roughered condition and capable of producing friction and pain at every movement.

The kidneys present all the pathological lesions usually met with in acute and chronic nephritis.

RHEUMATISM.

Rheumatism is a constitutional inflammatory affection, for a long time thought to be of lactic acid origin; however, it is now considered a toxaemia as a result of bacterial development. It has a tendency to attack articulations as well as muscular tissue. In fact, it can truly be said that rheumatism is no respecter of tissues. It has an acute onset and does not present peculiar or constant lesions. Although the joints are the chief seats of invasion, still in many instances, and even in aggravated cases, the pathological changes presented are slight or altogether absent. Especially is this true in muscular rheumatism. Usually the synovial membranes of the affected joints are injected, discolored, and swollen, and their articular surfaces coated with fibrin. The soft parts around the joints are often extensively infiltrated and swollen, which causes them to be extremely sensitive to the touch. These swellings are often soft or they may be tense and elastic, or edematous and pit on pressure. There is never supuration unless there is mixed infection.

The effusion accompanying rheumatism is chiefly of a serous consistency; however, it contains a small amount of fibrin and leukocytes. A similar exudate appears in the periarticular tissue, the tendon and synovial sheaths. In protracted cases the cartilages may become eroded. The synovial fluid is usually in excess and deeply colored with red. There is a tendency to formation of coagula and false membranes, which, when they become organized, produce lameness and stiffness. Softening and rupture of the tendons has been observed by several well known authorities. Calcification sometimes occurs. The affected joints often become denuded of their articular cartilage.

Whenever we are called upon to examine a horse suffering from lameness of the shifting variety, it behooves us, as con-

scientious practitioners, to make a correct diagnosis in the living animal. To do this we must intelligently consider the several differential diagnostic points between osteoporosis, millet disease and rheumatism. These we will now briefly consider.

DIFFERENTIAL DIAGNOSIS.

OSTEOPOROSIS.

1. Shifting lameness.
2. Chronic or slow onset.
3. No history of millet feeding.
4. Recoveries are extremely rare.
5. No decided kidney or urinary changes.
6. Bowel action normal or near normal.
7. Very slight elevation and variation of temperature.
8. Course and severity not influenced by atmospheric conditions; however, same is decidedly altered by climatic changes.
9. Almost always assumes the chronic type in spite of care and treatment, unless there is a rapid change to another more favorable climate. No results from treatment with salicylates or asperin.
10. Lack of spirit, sluggishness, ease of fatigue, even with moderate, slow and light work, are prominent symptoms. In the beginning there is presented very slight articular or bone (ostitis) lameness, which becomes gradually aggravated, accompanied by a slight elevation of temperature. No generalized or localized muscular soreness.
11. "Choppy," awkward, and clumsy gait, with a decided tendency to stumble. They frequently lie down and have no desire to get up.
12. No tendency toward the development of complications involving either the heart, lungs or kidneys.
13. Tongue not coated, and there is no sour odor from mouth, unless the jaw bones have become involved to such an extent that mastication is interfered with.
14. No discoloration of visible mucous membranes.

15. No noticeable localized muscular atrophy. General emaciation develops gradually and slowly.

16. No tumefaction of vulva and vagina in mares.

17. The mule is as much susceptible as the horse, and the disease affects them similarly.

18. Localized or generalized inflammation of the joints, characterized by heat, slight swelling, and some pain on pressure. Infiltration into the tissues in close proximity to the affected joints. However, infiltration and swelling of the joints is by no means a constant symptom, as we oftentimes observe lameness with no visible evidence of joint involvement.

19. In most cases there is a well marked synovial distension.

20. Does not attack tendons, hence rupture of them never takes place.

21. The bones become enlarged, thickened and softened. They may be easily pricked with knife or needle, and are readily indented by pressure. The teeth become loosened and mastication is impaired, difficult or impossible. Of course, in such cases digestion and assimilation is imperfect. Characteristic symmetrical face and lower jaw enlargement occurs in over 95 per cent. of the cases.

22. There is a tendency for the ligaments and tendons to tear away from their insertions, carrying periosteum and bone with them.

MILLET DISEASE.

1. Shifting lameness.

2. Acute or sudden onset.

3. History of millet feeding.

4. Discontinue millet feeding and the symptoms rapidly disappear; a large per cent. of the cases make quick and complete recoveries.

5. At first there is overstimulation of the kidneys, characterized by frequent and copious flow of urine. This is followed by partial or complete suppression of urine. The urine in the sub-acute and chronic stages is thick, light colored and

scanty. When the disease advances to the stage where chronic nephritis begins, we get intermittent colicky pains and other symptoms ordinarily encountered in cases of suppression of urine, including those of uraemia.

6. Bowels constipated.

7. Slight elevation of temperature (102-104) of the remittent type, which continues throughout course of the disease.

8. Course and severity not influenced by climatic or atmosphere conditions.

9. Rarely ever becomes chronic, provided the millet feeding is discontinued early. Medical treatment is unnecessary. We get no results from treatment with salicylates or asperin.

10. Lack of spirit and energy, associated with restlessness, loss of appetite, accompanied by indigestion, staring coat, painful expression, and general debility. Very little muscular soreness.

11. "Stilty," uncertain "straddling," and painful gait, often-times eliciting a groan at each step. There is constant uneasiness and the animal frequently shifts weight from one leg to another in rapid succession. There is a "tucking up" of flank and the animal assumes a cramped position with back arched and head dropped.

12. There is no tendency to the development of cardiac and pulmonary complications. However, kidney involvement is constant.

13. Tongue coated and peculiar sour smelling odor from mouth.

14. Visible mucous membranes are reddened.

15. There is no localized muscular atrophy; however, general emaciation takes place rapidly.

16. In mares there is often a tumefaction of the vulva which extends into the vagina.

17. Mules are not near so susceptible to millet disease as horses; however, when once contracted by the mule, it runs a severe course, and often leaves permanent lesions from which they rarely completely recover.

18. Localized or generalized joint soreness characterized by heat, swelling and pain. The joints involved are usually hock, stifle, knee and elbow.

19. Diminished amount of synovial fluid in the affected joints. In fact, its entire absence is not by any means infrequent.

20. No softening of the tendons, and they have no tendency to become ruptured.

21. No thickening or enlarging of any of the bones. No loosening of the teeth or interference with mastication.

22. There is a tendency for the ligamentous and muscular attachments to tear away from their insertions, carrying periosteum and bone with them.

RHEUMATISM.

1. Shifting lameness.

2. Acute or sudden onset.

3. No history of millet feeding.

4. Spontaneous recoveries are frequent.

5. No decided kidney or urinary changes.

6. Bowel action normal.

7. Temperature varies from normal to 106-107 degrees.

8. Its severity and course is altered to a slight degree by climatic changes. Atmospheric conditions play an important role in the development of symptoms, course and termination of rheumatism.

9. If not treated it ordinarily assumes the chronic type. In most cases the disease readily yields—temporarily, at least—to treatment with salicylates or asperin.

10. The animal becomes languid; has no desire to move; has a restless and painful expression. In most cases there is very pronounced lameness and generalized or localized muscular soreness. The elevation of temperature usually precedes any articular or muscular symptoms.

11. The gait varies in rheumatism, depending upon its location and severity and character of tissue involved. The affected

joint is usually held in a semi-flexible position and absolutely motionless.

12. There is a tendency to complications, such as myocarditis, pericarditis, endocarditis pleurisy, bronchitis, etc. No kidney complications develop.

13. Tongue is not coated and there is no sour odor from mouth.

14. Visible mucous membranes slightly injected.

15. Oftentimes there is a decided localized muscular atrophy. This may involve one muscle or a group of muscles. Emaciation takes place slowly.

16. No tumefaction of vulva and vagina in mares.

17. The disease is no more severe in the mule than it is in the horse. It is no respecter of animals. Appears in horse, mule, dog, cat, sheep, goat, and even wild animals.

18. Localized or generalized joint soreness, characterized by heat, swelling, pain and injection of affected joints. The soreness wanders from joint to joint, from joint to muscle, or from fascia to tendon, etc. It is no respecter of tissues. However, it rarely ever attacks bone. A joint which has once been rendered weak by previous injury or disease is especially liable to suffer. Infiltration and swelling of the soft parts about the affected joints causes them to be very sensitive to the touch. The swellings may be soft, tense, elastic, or oedematous and pit on pressure. In some cases there is no swelling or other external manifestation of disease; however, pressure or movement will elicit excruciating pain.

19. Excess of synovial fluid in the affected joints.

20. The tendons sometimes become softened and rupture.

21. No symptoms of bone lesions.

22. No tendency for the ligaments and tendons to tear away from their attachment.

For the past ten years, when called upon to diagnose cases of "shifting lameness," I have pursued the following course, and I am gratified to state that very few mistakes in diagnosis have been made during that time. My routine is as follows:

Examine maxillary bones. If they are not thickened we are quite safe in excluding osteoporosis. Make inquiry into the history of millet feeding. If informed that no millet has been fed, we can safely exclude millet disease. This leaves us to make a diagnosis of lameness from rheumatism by excluding the other two.

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THE POISON WEED PROBLEM IN THE ARID WEST.

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Of all the untoward conditions which hamper the live stock industry in the more arid regions of the West, that of poisonous plants on the open range certainly has the greatest economic significance.

While this question is paramount with the stockmen and depreciates the leading industry of this enormous area, yet strange as it may seem, very little systematic work has been done looking to a practical solution of the problem.

The open range conditions still prevail largely, and always will, because of the existing climatic conditions. A conservative estimate has placed the annual loss of live stock in Colorado alone at \$100,000.

Poisonous plants are often aggressive in the struggle for possession of the land, and thus become pestiferous to cultivated crops and supplant native grasses. Animals because of hunger eat more or less freely of them.

The results are not always acute poisoning, but on the contrary, may, as in the case of loco weeds, bring about a protracted condition of unthriftiness, failure to breed or put on flesh, followed by cachexia and death. The valuation of the animals actually destroyed does not near represent the aggregate loss sustained by poisonous plants. The loss of a few animals and a permanent injury to many, combined with the monopolizing of grazing lands by noxious weeds, have in many instances depreciated land values and curtailed profits until the owner is at last forced into bankruptcy and obliged to abandon otherwise ideal ranges.

The total loss to the state from poisonous plants no doubt exceeds one million dollars annually.

In the realm of toxicology we are still groping in the dark; the problems are many and intricate; it must be acknowledged that we have not made great headway. The following are a few of the many obstacles to contend with in poisonous plant investigation.

Some Animals More Susceptible Than Others.—Plants injurious to one species are harmless to others. The horse, mule, and goat eat poison ivy with impunity. Clover and alfalfa may cause a true intoxication, with bloating, under certain conditions, in ruminants; horses pasture upon the green plant without danger. Individuals of the same species show a wide divergence of susceptibility to poisons. As has been well said, "What is one man's meat is another man's poison." Poison ivy produces a violent inflammation of the skin on most persons. Some will escape and are apparently immune at one time, and equally as susceptible at another period of life. Throughout the vegetable kingdom, from bacteria all the way up to the mighty oak, we find species of plants poisonous under certain conditions, but few of them poisonous under all conditions.

Some Plants Are Poisonous Only at Certain Stages of Growth.—The lupines (wild pea—horse beans), are found growing in almost every section of the state and in great abundance on the Western Slope, and in many places are cut for hay; they are poisonous only at the time of going to seed. Larkspur (*Delphinium*), is very deadly early in the spring, and loses its toxicity almost at flowering time. The death cama (*Zygadenus venenosus*), growing from a poisonous bulb, is very deadly early in the season, but gradually becomes less harmful and dries up in July. Sorghum and kaffir corn, which became popular forage crops in the non-irrigable sections of eastern Colorado, have produced such disastrous results from feeding green at certain stages of growth that their cultivation has been generally abandoned. In Bulletin No. 37, of the Idaho Experiment Station, is found the following bearing upon this subject: "The roots of the wild parsnip or water hemlock, which are so virulent in the early

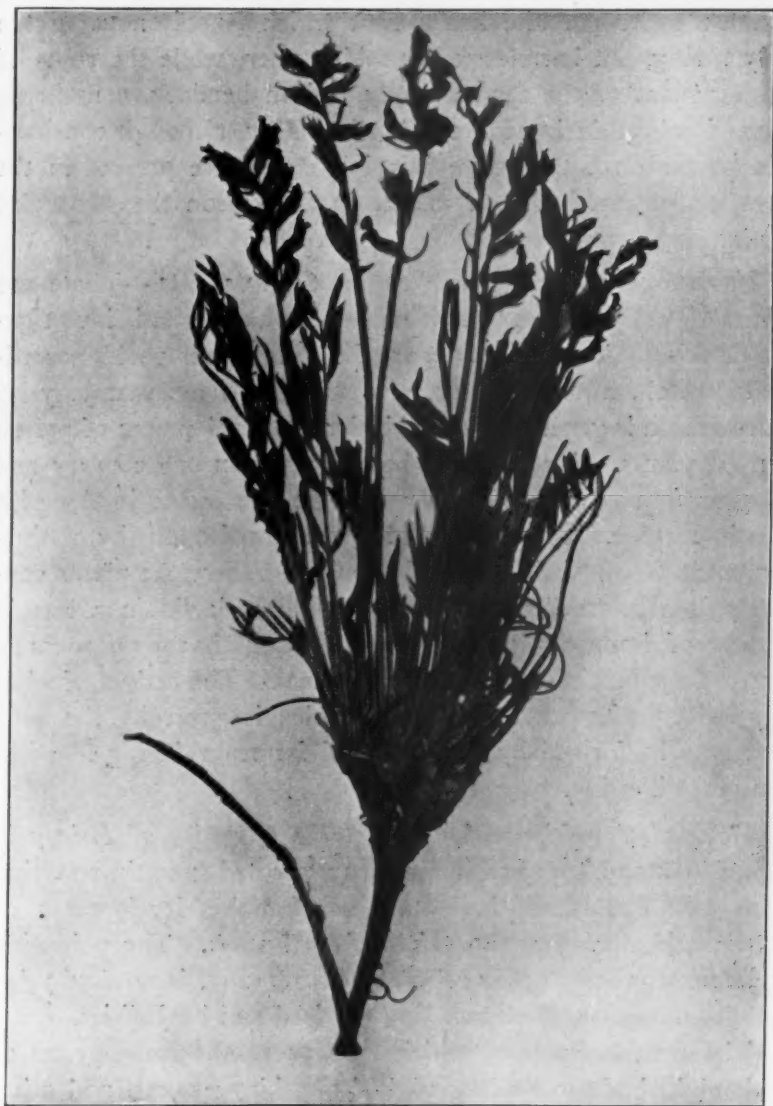


FIG. 1.—*Astragalus Mollissimus*. Commonly called "Wooly loco."

spring, have been fed to cows in the late summer and early fall without ill effect. Another member of the same family, the hemlock water parsnip, has a root which is poisonous in the early spring, but harmless after midsummer, while the roots of another plant of the carrot family, poison hemlock, contain no trace of poison during March, April or May, although considerable quantities of the active principle coniin are present in the leaves and stems by May. Later in the season the roots also become dangerous."

Variations According to Season, Climate, Etc.—There are other serious difficulties to contend with in a systematic investigation of this subject. The danger of certain plants varies according to season, climate, character of soil, etc., from year to year. A dry season is generally favorable for the development of poison in most plants. A plant may be poisonous in one country and harmless in another. Jimson weed is more active in America than in Europe. Some plants become less poisonous by cultivation, such as wild hellebore and aconite. Where the plants contain poison in small quantity the native stock obtain a certain amount of immunity and will feed without harm on a range that will prove disastrous to other animals. The active principle may exist performed in the plant, which is generally the case, or it may be formed by the action of ferments during mastication and digestion.

Unusual Conditions May Affect the Quantity of Poison in Plants.—In sorghum and kaffir corn a stunted growth, resulting from arid conditions, is best suited for the development of prussic acid, the most powerful poison known. The poisoning by Johnson grass (a near relative of sorghum), is no doubt due to the same cause, as shown by Crawford and by Jeffries.

The common potato, which belongs to the same genus as black nightshade, spreading nightshade, bitter sweet, and other dangerous plants, contains an active alkaloid solanine which develops in large quantities when potatoes become green from exposure to the sun. This is no doubt the cause of the sudden and

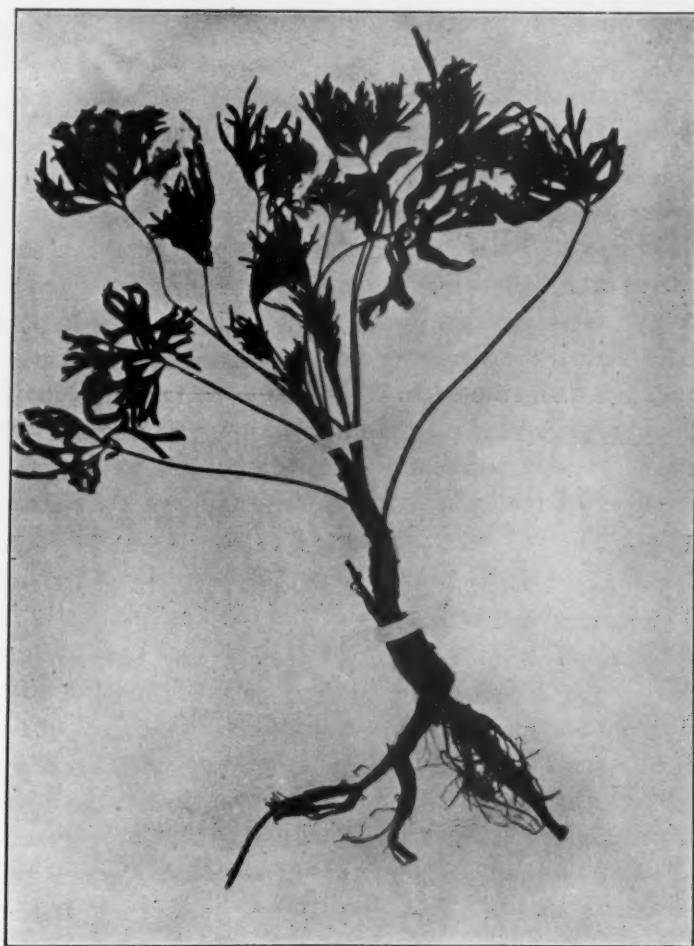


FIG. 2.—*Delphinium Geyeri Green*. One of the more common larkspurs. Not in bloom.

mysterious death of horses in the vicinity of Greeley that had been turned into potato fields after digging time, many small potatoes having been left on the surface exposed to the sun. The wilted leaves of the wild cherry are poisonous. In the eastern section of the state a scrubby cherry is found growing along the small streams and arroyas, and some loss in cattle has been reported. Several species of cherry are found growing abundantly along the ravines in the mountains.

Poison Found in Different Parts of Plants.—Another discouraging feature in poisonous plant investigation is that the poison is not always found in the same part of the plant. In the case of wild hellebore, aconite, showy milkweed, thorn apple, and many others, the entire plant is poisonous. In wild parsnips the roots contain most of the poison. In lupines and yellow dock the seeds are dangerous. In potatoes the roots may be harmless and the tops poisonous. In the mountain laurel and wild cherry it is the leaves. In milkweeds the stems are said to be poisonous. In the crowfoot family it is found that the flowers are especially dangerous.

Conditions Under Which Poisonous Plants Are Eaten.—Most poisonous plants are bitter and are avoided by animals. When confined to a certain range and not interfered with, they learn to avoid them, but are frequently poisoned while being moved from one locality to another. When an animal is hungry it will eat weeds that it would not otherwise touch. While driving the herd at the time of the roundup or to market they will be seen reaching for the tops of weeds that at other times they would not molest. It is a matter of common observation that the greatest amount of poisoning occurs under these conditions, and the reasons assigned are that the animals when driven for some distance become ravenously hungry and have not time to make the same choice of forage plants as when at rest.

The time of greatest danger is during or immediately after a rain or snow storm in the spring months. Alfalfa, whether green or cured, is known to be much more dangerous for cattle

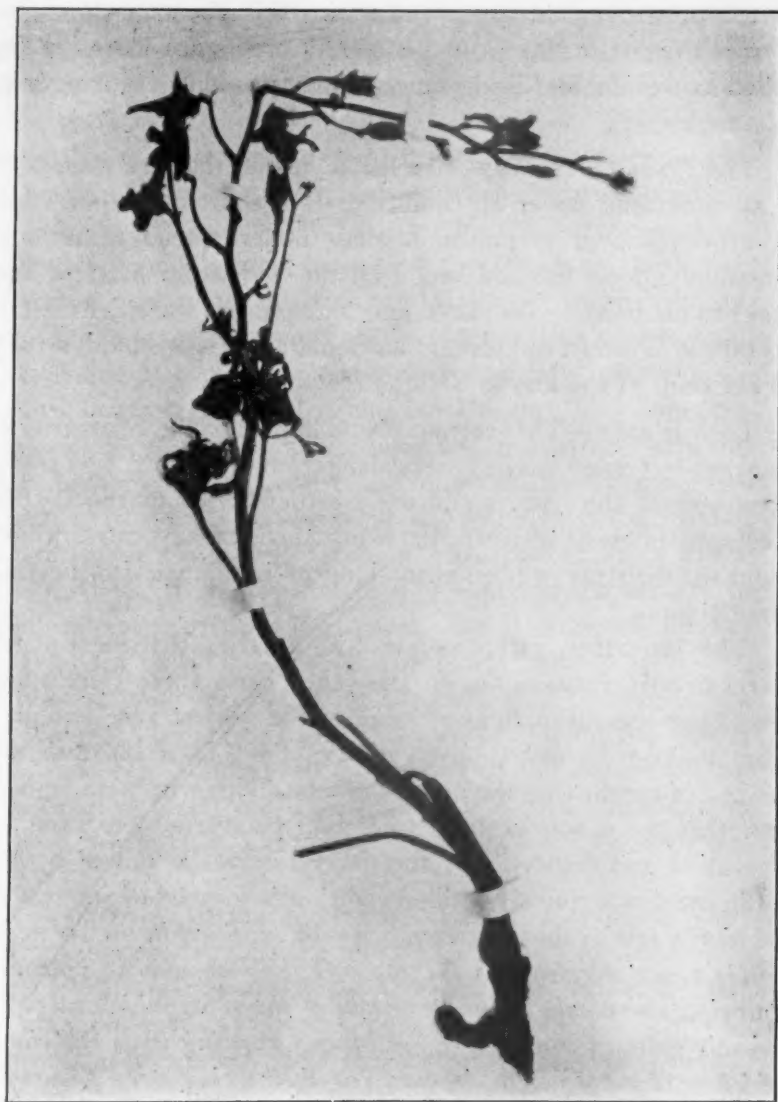


FIG. 3.—*Delphinium Nelsonii*. Dwarf larkspur. In bloom.

and sheep when wet from rain or dew. This seems to be the case with some poisonous plants, especially larkspur. The explanation most commonly proposed for this phenomenon, however, is that when the ground is wet the roots are more readily pulled and eaten, and being much more poisonous, the danger is enhanced.

The Chief Offenders.—The list of plants that are poisonous at all times and under all conditions is a short one; those that have been known to poison animals under special conditions, constitute a long list and range all the way from bacteria and fungi to the poison oak. Loco and larkspur are the chief offenders on the Western ranges and no doubt are responsible for fully 98 per cent. of the loss in Colorado.

Loco Weeds.—That certain plants known to the Spaniards as loco weeds (crazy weeds) were dangerous to horses, was traditional among the natives and early settlers prior to 1860. Exceedingly interesting were the many theories advocated to account for the strange phenomena induced in animals from eating these plants.

The "cow men" were as a unit in declaring that these plants were directly responsible, on the other hand there were those possessing less intimate knowledge of the subject and reasoning from analogy, by casual observation of the "feast and famine" method of conducting the range cattle business, who were equally sure that there was nothing to it but malnutrition induced by starvation and neglect. Of the many theories advanced by the cattle men to account for this condition it may be of interest to mention a few of the most common—First: *Sand in the stomach, gotten while digging for the roots of the loco weeds.* Second: *Parasites commonly found in crown of the roots which eaten by animals poison them.* Third: *A fungus growing upon the plants which was supposed to account for their being very poisonous in some places and not so in others.*

These and many more equally absurd hypotheses had no scientific value in themselves and were of interest only so far

as they added to the sum total of evidence against the particular plants as being in some way the causative factor.

Although several investigators have undertaken to solve the mysteries surrounding this perplexing problem nothing definite was ever accomplished until the Department of Agriculture undertook the work in a systematic way four years ago. The Experiment Station at Fort Collins co-operated with the work in Colorado by furnishing live stock and assisting in post-mortems.

In Bulletin No. 121, part 3, issued by the Bureau of Plant Industry, is found a brief report of the results of both field work and laboratory conclusions. In this report we find the following: "The name loco-weed has been applied to a large number of plants, but two are considered especially obnoxious—*Aragallus lamberti* and *Astragalus mollissimus*." "The principal pathological changes are pronounced anemia of the whole system, diseased stomach walls, and in acute cases a congested condition of the walls of the stomach, while in chronic cases, there are frequently ulcers. There is an excess of fluids in the various cavities of the body. This is especially noticeable in the epidural space of the spinal canal. In most locoed females the ovaries are found in a diseased condition."

In regard to the possibility of exterminating the weeds, the report says: "There seems to be no way of ridding the ranges of this, however." In regard to the care of the disease the report informs us that, "it was found that locoed cattle can in most cases be cured by a course of treatment with Fowler's Solution."

As to the cause of this condition, Albert C. Crawford, pharmacologist, reports, "It is the inorganic constituents, especially barium, which are responsible for this poisonous action at least in the plants collected at Hugo, Colorado."

The discoveries revealed by this investigation already are of much scientific value—their economic significance is in the future.

Larkspur.—In the category of poisonous plants of the West, the several species of larkspur easily take second place.

The genus *Delphinium* contains no less than eighteen species in Colorado and many of them are known to be poisonous at times. *The poisoning occurs mostly in the spring time and invariably during a rain or snow storm.* Last spring in one instance seventy-four head of cattle died out of a herd of about two hundred. The conditions in brief were—*cattle grazing upon larkspur after a spring shower that did not last to exceed ten minutes.* The same favorable conditions existing a large number of animals are liable to succumb, making the loss heavy in each instance.

Larkspur grows in great abundance in the mountains and *the greatest damage is done at an elevation of over 7,000 feet.* Dragendorff and Marquis report that in *Delphinium Staphisagria* a number of bases (delphinin, delphinoiden, staphisagrin) have been isolated. Several Western species of larkspur have been reported to yield an alkaloid, delphocurarin. *This alkaloid has been used in vivisection work and promises to be of some commercial value.* As to treatment for poisoning by larkspur atropine as a physiological antidote and potassium permanganate as a chemical antidote seem to give the best results. The stockmen relieve the bloating by "sticking" in the rumen; bleeding from the ear vein or tail is thought to best afford relief?

Most of the poisoning occurs when the animals are alone on the range, and therefore any effort calculated to curtail this heavy loss to the stockmen must be prophylactic in nature. In referring to my note book I find that of seventeen cases of heavy losses from poisonous plants in various sections of the state, sixteen of them were found upon investigation to have been caused by larkspur.

When you think of poison weeds in the Rocky Mountains, remember that it is mostly a loco-weed and larkspur proposition. The accompanying cuts were made from photographs taken from specimens from the Veterinary Department poison weed herbarium.

THE VALUE OF TUBERCULIN IN THE CONTROL OF TUBERCULOUS HERDS.

By VERANUS A. MOORE, Ithaca, N. Y.

Presented at the International Congress on Tuberculosis, Washington, D. C., Sept., 1908.

The awakening to the fact that tuberculosis existed to any considerable extent in the cattle of America was a result of the discovery of tuberculin by Robert Koch and its later application as a diagnostic agent. A careful inquiry into the extent and distribution of bovine tuberculosis shows that it is most prevalent in those districts where there has been the greatest interchange of cattle. As its dissemination depends largely upon the introduction of infected individuals it was not strange that with an unrestricted cattle traffic, many infected animals were innocently bought and sold, thereby carrying the disease and spreading its virus.

The usual slow development of tuberculous lesions in cattle, and the fact that many infected individuals are spreading the bacilli before their true condition is suspected, made it possible for a large number of herds to become extensively diseased, as a result of the increase in cattle traffic caused by the constantly growing demand of our large cities for milk.

When the extent of bovine tuberculosis was first ascertained there was a tendency to radical state control and slaughter of infected animals because of its supposed sanitary significance. The disease appeared to be one of such magnitude that the people looked to the state for both counsel and financial assistance in its eradication. The state efforts by legislation and official control, however, have not eliminated it as quickly as was generally anticipated. With a growing knowledge of tuberculosis and its parasitic nature, we are growing to realize more and more that it is not so much a matter of state, as it is one for the individual to deal with. Like a noxious plant its seed must

be kept out. While the state and nation have their responsibilities concerning it, the individual cattle owner must in the last analysis see to it that his herd is protected from infection, which usually comes with the purchase of tuberculous cattle or the feeding to calves of milk from tuberculous cows. It is therefore largely a personal problem, the solution of which is to be found in the methods adopted and followed by the individual owner protected by proper legislation and given as much other assistance by the state as the legislature may see fit to confer. The burden of the effort to eliminate bovine tuberculosis is with the individual farmers in whose herds the disease may exist. The work before us is to formulate methods that will enable individual cattle owners to apply the present knowledge of tuberculosis to the existing conditions in their herds with the least loss and the quickest returns. It is my purpose, therefore, to discuss the subject of bovine tuberculosis as an individual matter, and to point out the value of tuberculin in this personal conflict with it.

As tuberculin made it possible to determine the presence of tuberculous infection, it is also the one indispensable agent to rely upon in the control of this parasitism. While many of our states have passed laws relative to the use of tuberculin in the official effort to control tuberculosis, a large number of cattle owners have privately attempted to eradicate it by the same means. In New York I have collected some data on this point. In 1907, I secured the results of the tests made (1904-6) with tuberculin on 683 herds, containing a total of 12,721 animals. Of these only 262 herds, including 3,088 animals, were tested by the state, while 421 herds with 9,633 animals had been thus examined by privately employed veterinarians. The practical dairymen have come to recognize the inefficiency of a physical examination, and the necessity for some specific reaction to detect tuberculous infection. This has caused the value of tuberculin to be appreciated and employed by a steadily increasing number of cattle owners.

In using tuberculin certain apparent discrepancies have appeared which have caused many dairymen to question its value. This is due to the lack of knowledge concerning it. The dairyman does not distinguish between active, healed or latent tuberculous lesions, and up to a comparatively recent date pathologists have been unable to instruct them in the significance of these technical differences. It is important, however, that the *interpretation* of the reaction or non-reaction of tuberculin should be clearly understood. The experience of the last few years has called into question certain interpretations and conclusions concerning its accuracy that heretofore were accepted. The findings of Carini, that failure of tuberculin may be expected in about 17 per cent. of cases, and Lignières, that a tolerance may be established which results in a failure of the tuberculin to give a reaction in certain cases where later post-mortems reveal the presence of tuberculous lesions, have been somewhat general when tuberculin has been applied under certain conditions. The phenomenon of the tuberculin reaction has not been satisfactorily elucidated. The explanation offered some ten years ago by Eber, and recently modified by Smith will, if correct, do much to clarify the confusion regarding the non-reaction of tuberculin in cases where there are healing tuberculous lesions. According to this theory for the action of tuberculin "the tubercle bacilli have induced certain tissue changes, and with them certain new functions of the tissues have been aroused, which are the result of immunization." It is the action of the specific product resulting from these changes upon the tuberculin that causes the latter to split off a poisonous substance which produces the elevation of temperature.

A study of tuberculous lesions shows that when the process of healing begins there is formed about the foci a wall of fibrous, or fibrous and cellular, tissue which tends, to a certain degree, to separate the lesions from the surrounding tissue and the circulation. The specific product resulting from the tissue changes as stimulated by the tubercle bacilli in the focus is

therefore largely confined to the diseased area and cannot act upon the tuberculin if it is subsequently injected. This explains the failure of tuberculin to react in those cases where tubercles are healing. As a small part of the specific product of the tubercle may be disseminated in the circulation or surrounding tissues and as its elimination may be slow, it is not unlikely that the partial reactions that often occur may be explained on the hypothesis that there still remains enough of the specific substance to liberate poison sufficient to disturb the temperature, but not to cause a characteristic rise. More extended investigations are necessary to determine at what stage in the healing process reaction ceases either in part or completely. It is presumable that a number of conditions contribute to this result. In an experiment with 17 tuberculous cows, 12 failed after a certain time to react. The post-mortem examination revealed lesions that were small and few in number and in all cases but one they showed evidence of healing. In four of the five cases that reacted, quite as much reactionary tissue existed about the tuberculous foci as there was about those in the animals that failed to react. In one the disease was very active and general. In other words, the line of demarcation between the lesions in animals that react and those that fail to do so is not always apparent. Likewise, the failure of the animals to react during the period of incubation and the reaction that occurs before the lesions are in evidence, bring us to another point that must be recognized and explained on the same basis. Because of these limitations of tuberculin, results have been accepted as failures, when the conditions were such that the tuberculin could not cause a reaction or when the reactions have occurred before the lesions were of sufficient size to be readily found, or were localized in organs and tissues not ordinarily examined.

In the application of tuberculin by veterinarians for eradicating tuberculosis in private herds, it is very important that the limitations of its action be fully appreciated and explained to the owners. This is desirable in order that the necessary

precautions may be taken, and the expectations of the owner so adjusted that he will not be disappointed by the results. The tendency of cattle men to believe that when an animal fails to react, or ceases to react if it has previously done so, it is perfectly safe to be placed with sound animals, cannot be overcome without duly acquainting them with the facts. If the limitations of tuberculin and the possibilities of infection are taken into account, the conservative method of dealing with bovine tuberculosis, as first recommended by Prof. Bang, has great possibilities. In the state of New York it has been applied in a number of private herds with excellent results. In certain breeding herds it has been the means of saving valuable strains of animals. After separating those that respond at the first test, repeated injections at proper intervals have pointed out the individuals that were infected, but did not respond in the beginning. The breeding from the infected animals has been successful so that the infected individuals have been replaced by sound offspring. The infected animals are eventually a loss to the owner beyond what beef value they may possess; but valuable strains have been preserved so that the final depreciation is not serious. There are scores of infected herds in New York state that are being replenished with sound animals after this method and the Commissioner of Agriculture of that state is recommending it to the dairymen generally.

The real purpose of the Bang method is to build up a sound herd from a tuberculous one. The existing conditions relative to the duration and extent of the infection are important factors in considering the probable outcome of the non-reacting animals in the original herd. In certain herds where the Bang method has been applied under my personal observation, the results have been quite different respecting the original non-reacting animals. In one case, where there were 17 reacting and 13 sound individuals, but one of the 13 subsequently reacted, although tested semi-annually for four years. In other herds a much larger percentage have been victims of this insidious infection.

In one herd of 491 animals tested, there were 96 cows that did not react. These were placed by themselves in a practically new barn, and three months later, and every six months thereafter, the herd was tested. Those that responded were promptly removed and the stable thoroughly disinfected with 5 per cent. carbolic acid after each test. The results of the consecutive tests of the non-reacting animals are exceedingly instructive. They are as follows:

1904, July, 96 tested,	31 reacted,	65 did not react,	32.3% reacted.
1905, Jan., 65	" 8	" 57	" " 12.3% "
July, 57	" 15	" 42	" " 26.3% "
1906, Jan., 42	" 15	" 27	" " 35.7% "
July, 27	" 3	" 24	" " 11.1% "
1907, Jan., 24	" 2	" 22	" " 8.3% "
July, 22	" 1	" 21	" " 4.5% "
1908, Jan., 21	" 1	" 20	" " 4.8% "
Aug., 20	" 1	" 19	" " 5. % "

During this time these animals were kept by themselves. There was no opportunity for infection after they were removed from the general herd. Several of the reactors were examined post-mortem. The lesions were slight in extent but of long standing. They were surrounded by a wall of fibrous tissue. The conclusion seems to be warranted that these animals were infected while associating with the diseased cattle and that the lesions had become arrested before the first test was made. The lesions in those examined post-mortem were too old, and the tests were made too frequently, to suspect that they could have started and reached the stage of development found in the short time between tests. The repeated tests of the reacting animals in the same herd support this hypothesis. The tuberculin test made three months later showed fully 25 per cent. of non-reactors. Several of these continued not to respond, while others reacted again later. This oscillating of the morbid process between an active and an arrested condition is an important factor in considering the future of the supposed healthy animals and in interpreting the tuberculin reaction.

In addition to the value of tuberculin in eradicating tuberculous infection from a herd, it is indispensable in examining cows to be purchased in order to prevent its introduction. If they fail to react, and they come from infected herds, it is very necessary that the test be repeated. Experience has shown that when a herd becomes extensively infected (50 per cent. or more reacting) a considerable number of the non-reactors are suffering from latent or dormant tuberculosis which may become active later. The failure to recognize this fact has caused the disease to reappear in many herds where the reacting animals from the first test had been destroyed. This is illustrated from the following observation. In July, 1906, 92 cows from a tuberculous district were purchased on the tuberculin test. They were tested every six months thereafter. They were kept by themselves for a year, and were never exposed to known infected cattle after their purchase. The results of the subsequent tests were as follows:

1907, Jan., 92 tested, 0 reacted.

June, 92 tested, 3 reacted, 89 did not react, 3.3% reacted

1908, Jan., 89 " 24 " 65 " " " 27 % "

Aug., 65 " 4 " 61 " " " 6.2% "

In 1907 there were purchased for a dairy herd on the tuberculin test, 65 cows from a dealer who had secured them from a district in which there is considerable tuberculosis. At the same time, 52 cows were bought from a herd that has been kept free from this disease. The results of the subsequent tests of these two groups of cattle which were kept separate and not exposed to other diseased animals are instructive.

(1) *Cows from Infected Herds.*

1908, Jan., 65 tested, 17 reacted, 48 did not react, 26.2% reacted

Aug., 48 " 0 " 48 " " " 0 % "

(2) *Cows from a Tuberculous Free Herd.*

1908, Jan., 52 tested, 0 reacted.

Aug., 52 " 0 "

These animals were exposed to as much infection, if there was any at all, in barns and pastures as the previously mentioned cases. It is unfortunate that we have not records of these animals extending over a longer period of time, but they are sufficient to point out the importance of considering both the accuracy of tuberculin and its limitations.

Tuberculosis is unlike most other infectious diseases in that the tuberculous animals still retain their beef and breeding values if the disease is detected early. It is this intrinsic value of the slightly infected animal, which in some cases exceeds that for its milk production, that justifies the opinion set forth in this paper, that for the best and quickest results in eliminating bovine tuberculosis it must be controlled in individual herds. It is in this connection that the subject comes close to the practicing veterinarians, who, as guardians of the health of the animals, have not only great responsibilities concerning the prevention of this disease, but also unlimited opportunities.

The work in New York has pointed out very clearly the danger of building up herds with non-reacting individuals taken from herds in which there is a greater or less amount of tuberculosis. The sound herd rather than non-reacting individuals should be sought for by the purchaser. This will require more attention in breeding and less indiscriminate buying of cattle. The essential facts that have been elicited from the results of our work and which we have found to be important in the control of tuberculosis in individual herds may be summarized as follows:

1. The cattle should be tested with tuberculin, subcutaneous injection, and all of those giving a reaction should be removed. The reacting animals should be either destroyed, slaughtered for beef under proper inspection, or kept for breeding purposes after the Bang method. The choice of procedure must depend upon existing conditions.
2. The herd should be retested at intervals of from six months to a year and all reacting animals promptly removed.
3. Cattle for dairy or breeding purposes should be bought from sound herds only.

4. Animals that have once reacted should not be placed with sound cattle, although they may cease to react and remain well to all appearance.

5. Milk from cows of uncertain health should not be fed to calves unless previously sterilized.

6. It is desirable that the owners keep a record of the tuberculin tests of their cattle, made by competent veterinarians. Such a record of each animal is a valuable asset.

7. The application of tuberculin should not be trusted to unskilled persons.

8. In eradicating tuberculosis the individual herds are the units to deal with, and their owners must be held responsible for them.

THE management of the recent International Congress on Tuberculosis at Washington, D. C., awarded to the Bureau of Animal Industry, U. S. Department of Agriculture, a special gold medal for the best pathological exhibit. The REVIEW congratulates the Bureau on winning the highest prize in competition with other governments and with the leading tuberculosis institutions of foreign countries. It is an honor of which we may all feel proud.

A DIFFERENT VIEW OF THE SITUATION.—Since reproducing the little extract from the *Farmer's Advocate*, Winnipeg, Manitoba, in regard to hazing at the Ontario Veterinary College, Toronto, the REVIEW has learned some facts that show that account to be misleading. It would seem that the young men instead of "pressing civilians into service" as there stated, were, on the contrary, raided by a curious crowd, who forced themselves upon the students, even to the extent of entering the court-yard of the college; where, becoming mixed up with the freshmen, they were initiated in due form. Upon being released, they stirred the crowd outside to an attack upon the students, who naturally resented it and sought to protect themselves and their rights, and police interference became necessary. This throws a different light on the matter, and justifies the display of righteous indignation in the vigorous young men of that venerable institution.

SHIPPING FEVER.*

BY CHAS. H. JEWELL, VETERINARIAN, U. S. ARMY.

The term shipping fever is one generally applied by shippers of horses, to all the various febrile conditions of a contagious or infectious nature, attacking young animals during or following shipment.

These troublesome fevers are always present in the large sale stables of our great cities and costs our live stock owners many thousands of dollars annually. It seems to be one of the great problems for veterinary science to solve and I believe it is one of the duties of our great Bureau of Animal Industry to take up the work of eradicating these much-dreaded diseases from our great horse markets.

From a professional standpoint we recognize four (4) different forms or types, namely, influenza, strangles, catarrhal fever and pharyngitis with or without its accompanying laryngitis. All of these are infectious and cause great losses and inconveniences to the mounted service, especially when new and young animals are purchased. It is not uncommon to have fifty to seventy-five per cent. of such animals disabled on this account for several weeks and not unusual for large numbers to succumb from one of the many complications which so often follow an attack of any one of the above disorders. The most common complications are pneumonia, pleurisy, purpura haemorrhagica and rheumatism.

The symptoms of the various forms may be enumerated under the head of each disease and a general treatment can be prescribed with the exception of special cases.

Influenza.—Symptoms: High fever, 103° to 107° F., great muscular weakness; loss of appetite; yellow color of the visible mucous membranes; discharge from the nostrils; legs

* Presented to the forty-fifth annual meeting of the American Veterinary Medical Association, Philadelphia, 1908.

may be swollen; eyes swollen and watering; colicky pains; dung coated with mucus; flatulence causing the anus to be constantly open; respirations may be accelerated, especially when the lungs are involved; pulse full and bounding in the early stages later may become weak; nervous symptoms may occasionally develop.

Strangles.—Symptoms: High fever, 103° to 106° F.; muscular weakness; sore throat and cough; profuse discharge from both nostrils of a thick sticky nature; constipation; full bounding pulse; legs may be swollen; loss of appetite; the early swelling and abscess formation of the glands of the sub-maxillary and partoid regions and in some cases the formation of abscesses on different parts of the body, such as the neck, shoulder, etc.

Pharyngitis.—Symptoms: Those cases which appear in a contagious form show marked fever, 103° to 106° F.; loss of appetite; weakness; throat sensitive to the touch; head held stiffly and extended; water and feed are ejected through the nostrils when the animal attempts to swallow; discharge from the nostrils of a dirty green color; cough is often severe; breathing at times very difficult on account of the inflammation of the lining membrane of both the pharynx and larynx; swelling of the sub-maxillary glands; pulse accelerated; bowels constipated.

Catarrhal Fever.—Symptoms: This form of shipping fever, when uncomplicated, runs a much milder course than the preceding classes; usually we see a profuse sticky nasal discharge; temperature ranging from normal to 102° to 104° F.; mucus rale heard when the ear is placed over the trachea; throat may be slightly sore; legs occasionally swollen. The symptoms resemble very closely those of acute nasal catarrh, with the exception of the nasal discharge; which is more profuse in catarrhal fever and the latter disease takes an epizootic form, attacking all young animals within certain areas. As to the contagious or infectious nature of the above diseases the profession as a whole is united, but as to the incriminating germ in

any one of these maladies, we are as yet in the dark. It is my belief that each, representing distinct symptoms, must be caused by some specific infection.

Treatment.—The treatment of these disorders varies according to the severity of the symptoms manifested; first we look to the surroundings of the animals, such as the provision of a comfortable box stall free from drafts, the food should be laxative and of a tempting nature, all sick animals should be isolated if possible from the healthy ones to prevent further spread of the disease, in cases of strangles the abscessed should receive surgical attention, pharyngitis is often relieved by local applications, such as cold or hot packs and if the swelling be so great as to endanger the life of the animal it may be necessary to perform tracheotomy, the mild cases of catarrhal fever need only ammonium chloride 2 drams in the drinking water twice daily, should the legs swell it should be alternated with potass. nitrate one-half ounce once daily, complications must be treated as the symptoms arise.

In all cases where the fever runs high and accompanied by great muscular weakness the following prescription, which has combined, a valuable stimulant, tonic and diuretic is of the greatest value:

R

Spts. Nit. Dulc.

Spts. vini Recti aaf $\frac{3}{4}$ xvi.

Quinine sulph. $\frac{3}{4}$ ii.

M.

Any of the quinine which may not dissolve can readily be made to do so by adding a small amount of sulphuric acid, say one to two drams of the concentrated acid. Of this mixture give two ounces diluted with four ounces of water, administered with a dose syringe every two hours and gradually lessen the interval as the fever diminishes. This invariably reduces the temperature in one to three days, without the injurious effects so often seen by the use of dangerous antipyrites such as aceta-

nilid and the other closely allied products. In cases where the heart is very weak this treatment is greatly augmented by the hypodermic injections of small doses of strychnine, one-half grain, twice daily. Many of the newer products have been tried by the veterinarians stationed at Fort Riley, Kansas, and in most instances with gratifying results; among them is tallianine, nitrox antitoxin, antistreptococcic serum and influenza antitoxin, the two latter has been most used as a preventive, of which I will speak later. Tallianine in many cases seemed to work like magic in reducing the fever and strengthening the animal, and again the results were nill. The later product which is now claimed to be heavier charged with ozone and more stable, I have not had the opportunity of observing its effects. The nitrox antitoxin has given uniform results in all cases upon which we have used it and has proven highly beneficial especially in cases where we have lung complications. It reduces the fever very quickly and increases the vigor. It should be injected intravenously and at blood heat, using precautions as to antisepsis. Most of these new drugs are great aids in the treatment of these maladies; but on account of their high price most practitioners can only use them as adjuncts to the older and cheaper remedies.

Preventive Treatment.—This consists of employing means to prevent young horses coming in contact with the contagion, such as infected animals, stables, cars, etc., through an intelligent disinfection of stables, cars, utensils, etc., which may have become contaminated, and the use of antitoxins. The latter is along the lines of advanced medicine and deserves more than a passing notice. These serums are prepared from blood taken from horses, whose immunity to these diseases is at its maximum. This immunity is produced by the animal having passed through a previous attack rendering the blood strong in antitoxic properties. The blood must be drawn and handled in a manner to keep it perfectly sterile, if contamination takes place it is worthless. The serum is passed through a filter and then tested upon

culture media to test it for contamination, if sterile it is then tested upon a guinea pig to test its safety; if it then meets all requirements it is sealed under strict aseptic precautions.

There are three different products or serums upon the market at present, namely, Park, Davis & Co.'s influenza antitoxin, Mulford's diphtheria antitoxin and Pasteur's antistreptococcic serum. Of these we have used all three to a certain extent in the army and all apparently have antitoxic properties, but the immunity produced is transient, lasting all the way from two weeks to three months. The experience gained by their use at Fort Riley showed the influenza antitoxin of Park, Davis & Co. to produce a longer immunity than the antistreptococcic serum.

The serums were all tried at different times upon horses purchased in the St. Louis sales stables and shipped to different army posts, but since these animals had, in most cases, the contagion of some one of these fevers within their systems at the time of injection, the test could not be considered a fair one, yet the results in each case seemed to denote that there was a material benefit derived. The animals which I had an opportunity of observing stood the shipment well, the cases were tardy in developing after arrival and in most instances mild in form.

At Fort Riley, we have upon two occasions used the serums to control outbreaks of influenza with very satisfactory results. The first outbreak in which we used the antitoxin was in the spring of 1907, when we injected about twenty young animals, which had not previously passed through any form of shipping fever, with antistreptococcic serum and about thirty with influenza antitoxin, the outbreak was immediately checked and we did not have any more cases develop under two weeks, then at different intervals several cases developed, five which received the antistreptococcic serum developed very mild forms of influenza, and later three which received the influenza antitoxin came down with a mild attack of the same disease.

In the spring of 1908 we had another attack of influenza, which threatened to severely cripple the Mounted Service School

and we injected seventy-four young horses, which had not previously been affected, with influenza antitoxin, and thus far only two horses have developed influenza or other forms of shipping fever and from two to three months have elapsed since the animals were injected.

Six private horses which were associated with the school horses were injected with diphtheria antitoxin and among that number not one case of fever developed.

Conclusion.—The results of our experience seem to be highly gratifying and I believe that there are many advantages derived by the immunization of young horses against these dreaded fevers. The advantages are as follows: if horses are injected before shipping into markets where the contagion is sure to be met with, it insures the dealer to almost a certainty that he can dispose of his animals before they are taken sick with shipping fever and thus insures him against the loss of some of his animals which if they are not injected is pretty sure to happen; if the animals are to be shipped it insures their reaching their destination before being attacked and should they have an attack after the immunity is worn off they are under better condition to withstand it than when weakened through shipment; in case of an outbreak under conditions whereby a business is liable to be crippled one can by injection of the well horses check its spread and save great loss by the increased work which the animals can accomplish. I believe with thorough disinfection and repeated injection that outbreaks can be thoroughly stamped out by the use of antitoxin.

The objections which might be raised is the expense incurred by repeated injections of a large number of animals, and also the short period of immunity produced, but if through its use we can save the life of two or three animals out of a hundred the expense is soon eliminated even without taking into consideration what a large firm might lose in the loss of work from animals being laid up with some form of shipping fever. The length of immunity usually carries the animal over the period

when the contagion is at its greatest virulence and then if the animal suffers an attack it is very mild, owing to the lessened virulence and the increased resisting power of the animal, the result of the antitoxin.

This is a subject which should concern the advanced men of our profession, since the majority of veterinarians concede that our future treatment of contagious diseases will be along the line of immunization.

This work is in its infancy and there is a great future for serums and serum therapy in both human and veterinary medicine.

A LESSON FROM NATURE.—“Young gentlemen,” lectured the eminent instructor, “you are old enough now to put away the childish and trivial amusements that sufficed for you when you were younger. Learn a lesson from the dumb brutes and even from the reptiles. When they arrive at maturity they comport themselves with a certain dignity.”

“It isn’t so with the rattlesnake, professor,” objected the young man with the bad eye. “The older he grows the more rattle he plays with.”—(*Chicago Tribune*.)

PETTING A HORSE.—“Not many people know how to pet a horse, from the horse’s standpoint, at any rate,” said a trainer. “Every nice-looking horse comes in for a good deal of petting. Hitch a fine horse close to the curb and you’ll find that half the men, women, and children who go by will stop for a minute, say ‘Nice horsey’ and give him an affectionate pat or two.

“The trouble is they don’t pat him in the right place. If you want to make a horse think he is going straight to heaven hitched to a New York cab or delivery wagon, rub his eyelids. Next to that form of endearment a horse likes to be rubbed right up between the ears. In petting horses most people slight those nerve centres. They stroke the horse’s nose. While a well-behaved horse will accept the nasal caress complacently, he would much prefer that nice, soothing touch applied to the eyelids. Once in awhile a person comes along who really does know how to pet a horse. Nine times out of ten that man was brought up in the country among horses and learned when a boy their peculiar ways.”—(*Exchange*.)

THE SIGNIFICANCE OF PATHOLOGY TO THE PRACTITIONER.

BY A. T. KINSLEY, M. SC., D. V. S., PATHOLOGIST, KANSAS CITY VETERINARY COLLEGE.

Presented to the Forty-fifth Annual Meeting of the American Veterinary Medical Association at Philadelphia, Pa., Sept. 10, 1908.

Pathology is the science of disease. It includes the etiology and pathogenesis (course, pathologic anatomy and physiology) of disease. Pathology, like some other subjects pursued by veterinary students, has advanced rapidly in the last few years. Veterinarians that graduated twenty years ago, fifteen years ago, and even ten years ago did not have the opportunity of obtaining a comprehensive understanding of pathology because pathologic knowledge was imperfectly classified, and an understanding of pathologic principles was not deemed essential in the education of veterinarians.

Veterinary practitioners' professional duties are primarily the prevention, treatment and relief of disease of the domestic animals. A thorough understanding of the normal structure and functions of the various organs of the animal body is a prerequisite to the comprehension of disease. Rational treatment is dependent upon a correct ante-mortem diagnosis of the disease. The underlying principles of an accurate ante-mortem diagnosis, regardless of method employed in obtaining the same, are the pathologic lesions and modified functions.

Ante-mortem diagnosis may be determined by a clinical examination alone, especially in those diseases having characteristic or pathognomonic symptoms as tetanus, spavin, etc. The diagnostician consciously or unconsciously notes the perverted function of the voluntary musculature evidenced in tetanic contractions in an animal afflicted with tetanus, and the abnormal osseous formation that alters the structure and produces pain during the activity of the tarsal joint in an animal afflicted with spavin. The recognition of the pathologic lesion is the basis of the diagnosis.

A correct ante-mortem diagnosis, in some cases, is obtained only by laboratory examination, as in lukæmia and follicular mange. Lukæmia is not distinguishable from Hodgkin's disease and lympho-sarcoma except by a microscopic examination of the blood of the affected animal. Follicular mange is so similar to eczema that it is necessary to demonstrate the presence or absence of the follicular parasite to differentiate the two diseases. Laboratory diagnosis is looked upon with considerable disrespect by some practitioners, probably because of their lack of knowledge of its importance. The laboratory is only an extension of a hospital ward, and a hospital ward is in reality a laboratory where the pathologic phenomena of disease can be more closely observed. Laboratory diagnosis is not necessarily a microscopic examination. In some pathologic diagnoses, as the examination of urine for albumin, all the apparatus required is an alcohol lamp or Bunsen burner, a few test tubes, and a bottle of concentrated nitric acid. The technique is simple; it requires only a moment's time; the reaction is easily recognized, and the presence or absence of albumin having been determined, the diagnostician has this additional information to aid in diagnosis. The presence or absence of sugar in the urine can be determined by the addition of a few drops of a 1 per cent. aqueous solution of picric acid to a small quantity of urine; a mahogany or carmine color indicates the presence of sugar; any other color indicates its absence. The hæmoglobin content is quickly, easily, and accurately determined by use of a hæmoglobin scale book, a book containing several sheets of absorbent paper and a color scale. This test can be made by a practitioner efficiently in one minute's time, and a knowledge of the relative percentage of hæmoglobin is of considerable value in diagnosis and also treatment.

In the ablation of carcinomata and soft sarcomata, the operator is often at a loss to know whether the entire growth has been removed. The following test applied to the dissected surface of the ablated tumor has been found quite reliable:

1. Wash the cut surface until all the blood has been removed.

2. Submerge the cut surface in 5 per cent. aqueous solution nitric acid ten minutes.
3. Wash in running water five minutes.
4. Submerge cut surface in methyl alcohol two to three minutes.
5. Examine cut surface with unaided eye to ascertain whether any tumor or glandular tissue is exposed.

The effect of the above method is to render all malignant tumor tissue and glandular tissue dull, and opaque, white and fibrous tissue is rendered gelatinous, translucent and homogeneous in appearance and somewhat india-rubber-like in consistency. Fat is unaltered. If dull, opaque, white spots appear on the cut surface of the ablated mass, more of the tissue must be dissected away.

The agglutination test for glanders is now at the command of practitioners. Inoculation of small animals, as guinea pigs and rats, may be resorted to in determining the specific infectious agent in an outbreak of an infectious disease. Thus the microscope is not essential for every pathologic diagnosis, and a laboratory diagnosis is not essential in all diseases, however its application is extensive, and a thorough knowledge of it is of inestimable value to veterinarians. Some pathologic diagnostic methods require so much time and apparatus that the successful practitioner can better afford to send the specimens to some pathologist for diagnosis.

Practitioners are frequently called upon to diagnose disease by post-mortem examination. Correct interpretations of lesions observed in post-mortem examination is certainly the application of pathologic principles or is applied pathology, and may be illustrated as follows: In the group of diseases designated septicaemia, soft tissues have a parboiled appearance and are hemorrhagic. Acute inflammation, regardless of its cause, is accompanied by loss of lustre, swelling, increased amount of blood in the affected area, and more or less tissue destruction. Chronic inflammatory disturbances result in proliferation of fibrous con-

nective tissue or fibrous hyperplasia. Granulomata are a group of diseases in which the principal lesion approximates granulation tissue, as in glanders, tuberculosis, actinomycosis, botryomycosis and epithelioma contagiosum. New growths or tumors are quite variable in their gross appearance, but there is little difficulty in differentiation of them from other morbid conditions by macroscopic examination. Sufficient concrete examples have been enumerated to indicate that a knowledge of pathology is absolutely essential in arriving at a correct post-mortem diagnosis.

The symptoms are suggestive of the treatment of disease, but the lesions are the only true guide to the rational application of remedial agents. When the lesions have been determined in a given disease, the specific reason why those tissue changes occurred should be understood by the prescriber. However, there is and probably always will be different interpretations of the existing lesions and the medicaments that will give relief to the same. Thus active pulmonary hyperæmia is treated by some practitioners with febrifuges and heart depressants, while a neighboring veterinarian claims equally good success in the treatment of the same condition with heart stimulants. Where is the discrepancy? The actual lesion existing is excessive dilatation and engorgement of the terminal capillaries of the bronchial veins. The practitioner that prescribes febrifuge and heart depressants to a horse afflicted with active pulmonary hyperæmia invites an extra amount of blood to the cutaneous tissue, thus diminishing the quantity of blood in the internal organs and in this way relieving the hyperæmia of the lung. In addition, heart depressants diminish the force of the heart and this tends to diminish the quantity of blood passing to the lung. If the cause of the active pulmonary hyperæmia was undue exposure in which the cutaneous vessels have been constricted, then the febrifuge is correctly prescribed. But if the active pulmonary hyperæmia is a result of irritation to the pulmonary mucous membrane, the febrifuge is contraindicated because the reaction of the mucous membrane in the production of an hyperæmia is nature's method

of neutralizing or overpowering the effects of the irritant upon the mucous membrane, and a heart stimulant is indicated to increase the activity of the heart and thus maintain the hyperæmia by sending more blood to the scene of action. From the pathological point of view all active hyperæmia and inflammatory disturbances should be treated by those means which will maintain the increased quantity of blood flowing into the affected part. Bier's treatment of disease consists in maintaining an excessive amount of blood in the diseased tissue by mechanical means. The foregoing is the same proposition except it depends upon physiologic and pathologic processes rather than mechanical interference. Œdema is usually a secondary condition due to depressed circulation, as valvular stenosis or insufficiency, obstruction of venous outflow, vasomotor neurosis or hydræmic blood. Efficacious treatment depends upon the specific cause of the œdema, *i. e.*, the prescriber must know and understand the existing pathologic condition to successfully treat the case. Fever is an excessive high temperature, a result of disturbance in the thermogenic or thermo-regulating nerve centres produced by toxins or metabolic tissue products. The proper treatment for the relief of fever, from the pathologic viewpoint, would depend upon whether the fever is the result of nervous influences producing cutaneous disturbances and failure of radiation or dissipation of heat, or whether it is the cause of excessive oxidation in the tissues. The treatment of fever must be combative, for this process is not, like active hyperæmia or inflammation, a protective action, but is destructive and injurious.

Prognosis of disease is of considerable moment, and many practitioners have gained an enviable reputation by accurately foretelling the outcome of disease. To give the prognosis of a diseased condition requires an understanding of the existing lesions and a knowledge of the termination of those lesions. If a practitioner examined an animal with a swelling in the region of the withers and prognosed a speedy recovery, his prognosis may be correct if the swelling was inflammatory, but if the swelling was sarcomatous his prognosis would probably be incorrect.

In the preceding an attempt has been made to show the importance of pathology and its relation to the practice of veterinary medicine and how practitioners may readily confirm their clinical diagnosis by pathologic tests. It has been indicated that a pathologic knowledge is the sheet anchor for accurate diagnosis, both ante-mortem and post-mortem, macroscopic and microscopic, for rational treatment and for correct prognosis.

We predict that the practitioner of the not far distant future will be employed to prevent disease in the domestic animals, his financial reimbursement being proportional to the degree of success he has in the prevention of disease; each sick animal in his charge will mean a deduction from his income. When this time comes the practitioner will be of necessity a pathologist, and will determine the hæmoglobin content and the opsonic index as readily as he now determines the character and frequency of the pulse.

TRoubles of the INANIMATE.—“Tough old world, this,” sighed the anvil. “I get nothing but hard knocks all day long.”

“Yes,” assented the bellows, “and I am always hard pressed to raise the wind.”—(*Boston Transcript*.)

VETERINARY DIRECTORY OF ILLINOIS.—The Board of Live Stock Commissioners of Illinois has issued a very useful little book of 115 pages, neatly bound in leather, containing a revised list of the veterinary surgeons licensed to practice under the terms of an act entitled “An Act to regulate the practice of veterinary medicine and surgery in the state of Illinois.” It also contains the names and addresses of the members of the Board of Live Stock Commissioners, Board of Veterinary Examiners, State Veterinarian, Secretary, and a copy of the Veterinary Practice Act of Illinois.

Two divisions of licensed veterinarians, an alphabetical one and one of veterinarians by counties, are included in the directory. The name, post-office address, county, and kind of license, whether graduate or non-graduate, are given. The name of the college is stated in case of graduates. The directory contains 1,289 names, of which 656, or something over 50 per cent., are graduates.

REPORTS OF CASES.

"Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations, he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science."

INFECTIOUS ANEMIA OR SWAMP FEVER.

By G. H. ACRES, V.S., SUDBURY, ONTARIO, CANADA.

I have just read Dr. Mohler's very interesting article in the November REVIEW on infectious anemia, typhoid fever, also called swamp fever and other names. I have seen and treated a number of horses suffering from this disease during the past eight years, and have found it prevalent in both North and South Alberta, the Yukon Territory and Northern Ontario. The symptoms, causes, etc., described by Dr. Mohler are so well given that I will not repeat them. I would like, however, to draw your attention to my latest method of treatment of the above, and the results obtained; also my theory of infection.

I believe that this disease is found only on low-lying and swampy pastures, where the water becomes stagnant during the hot months of the year. I have never seen an outbreak of this disease caused by putting a diseased animal in a stable with healthy horses, but I have seen horses feeding on high, dry pastures, with good water, contract the disease in this way: A diseased animal turned out in said pasture with healthy horses, expels the germs which are excreted in the faeces of the diseased animal, which germs again become virulent after coming in contact with the ground, particularly if the weather is at all wet, and healthy animals grazing in the immediate vicinity become infected.

Regarding the treatment of this disease, I have always been very careful about feeding, and give little or no hay; green food if procurable, but very little; plenty of fresh water and warm bran mash; small amounts of boiled oats. My reason for this is that I believe the germ is situated principally in the intestines, and in order to secure good results from internal antiseptics, the intestines should be practically empty. I think a little exercise every day, if the animal can take it, is good. I have treated sev-

eral cases near here within the past few months, and have obtained the best results with the following treatment: When the first case was observed, the men in charge were instructed to watch the remaining animals very carefully. Immediately, one refused its feed, and appearing sick, was at once put in the stable and treatment commenced. In this way, they were caught in the early stages; medicinal treatment was as follows: 2 drachm doses of Liquor Cresol in a pint of water, four or five times daily; if the animal is very weak, grain doses of strychnine three times daily are beneficial. The following was given three times daily in a bran mash: Potassium-chlorate, $\frac{1}{2}$ oz.; Antifebrin, 2 drachms; Ferri-sulphate, 1 drachm. In cases where strychnine was not being given, nux-vomica was added to the above. I have tried quinine sulphate, potassium iodide, iodii resub, arsenic, hydrochloric acid and other drugs, but obtained the best results from the antifebrin treatment. The animal, however, is generally subject to several relapses which none of the drugs above-mentioned seem to prevent. This occurred in the cases which I have been treating recently; so frequent were the relapses, that I despaired of the recovery of the animals. The first case brought to my notice was so far gone that she died after the third relapse. Five remaining cases did well, excepting for the continued relapses. I then decided to try Antistreptococcic Serum. I obtained an ounce vial of this, and injected the contents hypodermically into a bay mare, which had just recovered from her second relapse, and had been under treatment about three weeks. For two days following the injection, the liquor-cresol was continued, with light diet. On the third day the former was stopped, and exercise increased daily. In two weeks more, she was put to work in a logging camp, and is doing very well. Two more animals were then injected; one had been suffering for six weeks, and had had four or five relapses; the other had been sick about four weeks, and had had three relapses. The injections were made when the temperature was near normal. The second case was a very bad one, but after the serum, he made a rapid recovery, and is now working every day. The other animal had a relapse and eventually died. There remained two cases yet, both of which had been sick for over two months, and had had so many relapses that hopes for recovery were given up. One horse made a splendid recovery, and is now doing light work and rapidly gaining in flesh and strength. The other, a few days after the injection, de-

veloped lymphangitis in the foreleg, with a temperature of 105° F. In the course of a few days, the temperature became normal, but the leg remained enlarged and painful for several days. I communicated with Parke-Davis & Co. regarding the serum treatment, and they kindly sent me a dose of serum to try on this last animal, which I did about a week ago. This was two weeks after the first injection, and at this time he was very weak, and unable to move. The animal is now able to be exercised, and appears to be making a good recovery. I believe that if one or more doses of this serum were given to the animal during the first symptoms, or at the end of the first attack, a perfect recovery would follow, and the utility of the animal would be restored. So far, I have only injected the serum when the temperature was near normal. Under the medicinal treatment, few of the animals which did recover were able to do any work, and were continually subject to relapses. I think it would be well worth while giving this serum treatment a thorough test, but at the present time, it is too expensive for private experiments, although I am sure any practitioner who has had any experience with this disease will realize what a great help it would be if it is proven conclusively that the antistreptococcic treatment is reliable.

A short time ago, I sent a sample of blood drawn from one of the above-mentioned cases to the Biological Laboratory at Ottawa for analysis, and was informed that the germ influenza was very prevalent under the microscope. They are now making cultures, and I expect to receive further information shortly. From the clinic, no symptoms of influenza were to be observed, excepting the high temperature and labored breathing, which we have in most forms of fever. The blood obtained formed a solid clot shortly after extraction, and only a small portion remained red, as described in Dr. Mohler's article.

If any readers have had any experience with this serum treatment, I should be very glad to hear from them.

NEW LIGHT UPON NYMPHOMANIA IN THE MARE.

BY MARK WHITE, V.M.D., DENVER, COLORADO.

We are all aware of cases of nymphomania in the mare due to ovarian diseases and inflammation of the vaginal mucous membrane and clitoris, but I have something new.

My attention was called to a fine mare that had been a sufferer of nymphomania for over two years, without any improvement. My course of examination was first to pass my hand in the rectum and feel the ovaries, to ascertain if there was any enlargement of the organs. I found that the ovaries were normal in size and had a normal feel. So I informed my client that the trouble must be elsewhere and that it was not a case, in my judgment, for ovariectomy. Next I examined the vaginal membrane and the clitoris and I found that the sack-like gland of the clitoris (which has for its function the manufacturing of sebaceous lubrication material) filled with a calcarious material to its utmost, imprisoned so it could not get out. So I curetted out this material, which reminds one of the "bean" that we often remove from the gland of the horse's penis when washing the sheath.

Here is the important point that should be of much value to the practitioner when dealing with these cases. This calcarious deposit had laid in this gland of the clitoris for years and acted as a foreign body setting up irritation and creating much inflammation of the organ, followed by excessive passion, stimulation and symptoms of nymphomania.

The important lesson taught by this case is that many mares have suffered their ovaries to be removed unnecessarily; that most or a large per cent. of cases of nymphomania of the mare are due to nothing more than the filling up of this gland of the clitoris. We know how annoying to the dog it is when the Anal glands (which are sack-like) become filled up with sebaceous material and almost run the dog mad. This same gland situated on the horse's penis, no doubt causes considerable annoyance to the animal, when the so-called "bean" forms.

It is quite possible that some of the profession are in possession of the knowledge that I have only just gained pertaining to nymphomania in the mare, but I must confess that my education and experience has not afforded me such knowledge. So if I have not told the profession anything that is new to them, I most modestly beg their pardon for my presumption. The practitioner often meets diseases and important conditions of animals that are entirely new to him and foreign to his education and text books, but he is too modest to report such cases to the profession, for fear that he has not come across anything of interest, and would only be exposing his own individual ig-

norance, if he should report such cases. For this reason many veterinarians are in possession of knowledge of great interest and value to the profession, that will go down with them into their graves.

Do not be too quick to remove the ovaries of the mare.

TALLIANINE AND PHENOL TREATMENT IN TETANUS.

By J. FERGUS DONNELLY, V.S., ST. JOHN'S, NEWFOUNDLAND.

On September 25th a client of mine brought one of his horses to my infirmary, wishing me to have a look at him, and also stated that he seemed rather stiff in his action.

Upon examination of the animal I noticed that he was developing tetanus, and ordered him to immediately take him home and I would go and see what could be done for him. Upon arriving at his stable I found the animal in question showing well-marked symptoms of this disease, and upon examination found both knees cut, the skin covering the head of the Humerus badly torn, and anterior to the angle of the "Ilium" another abrasion which had a scab formed.

Questioning the owner relative to the history of the case, I was informed that another horse kicked and knocked this one down some time ago, and it received the above cuts.

I told him that the horse had tetanus, and I was very much afraid that nothing could be done for him, but that there was a new treatment now being used and if he wished I would try it. He seemed perfectly satisfied, as only a month previous he had paid \$200 for him. I began my treatment as follows:

First I placed the animal in a dark place away from all other horses and gave strict orders that no one was to go near him, only the man in charge, and he was to be very careful when approaching or working about him.

I then plugged his ears with cotton wool, and opened up all the cuts, having to dissect a large piece of the muscle from the shoulder, which I then treated with a 5 per cent. solution of Phenol, and applied Ac. Boracic after.

I then gave him 30 c.c. of Tallianine intravenously, and ordered $\frac{1}{2}$ 5 Phenol to be given in his drinking water twice a day.

The animal could eat and drink fairly well, but was very stiff and the Membrana Nictitans was about two-thirds over the eye and tail erect.

The following day I again gave 20 c.c. Tallianine and the usual dose of Phenol.

I continued this treatment for 4 days when I reduced the dose of Tallianine to 10 c.c. and then stopped its use, but continued Phenol for 8 days after, when all symptoms had disappeared.

I then placed him on tonics and about one week later he was hitched and used a little in the mornings, and to-day he is hard at work and looking much better than before his attack.

PERSISTENT HYMEN.

BY M. PAGE SMITH, D.V.S., WASHINGTON. D. C.

On October 14, 1908, a sorrel mare was sent to the Hospital of the United States College of Veterinary Surgeons, for examination.

This mare is owned by Mr. James S. E. Maddox, of Warrentown, Va., and is valued at \$5,000. She is a sorrel, about 2½ years old.

About eight months ago the owner noticed a membranous sac protruding between the lips of the vulva, after each act of micturation. Owing to the value of the mare, the owner became alarmed and sent to this city for a veterinarian. She was examined by several veterinarians, all of whom said that there was a rupture of the vaginal wall, allowing the bladder to pass up into the vagina. They said the mare could not be operated on and would never breed.

Dr. Harry W. Achisen was called in later and ordered the mare sent to the Hospital.

On October 15 I examined the mare and found that by pressing firmly on the so-called tumor, that it reflected back into the vagina, forming a curtain, attached all around its edges. The meatus being on the floor just posterior to it. This curtain was nothing more than a persistent hymen, very much thickened and entirely imperforate. Behind the hymen was a quantity of grayish-colored thick fluid which pressed the hymen out and gave it the appearance of a cyst.

A consultation was held by Drs. Robinson, Achisen and myself. We decided that the case was very simple and only required a rupture of the membrane, and the removal of a portion of it.

When the first incision was made about a quart of the thick grayish fluid flowed out. After the operation the vagina was flushed twice daily with an antiseptic solution, and on October 25th the mare was shipped home, ready to breed.

SUBPERIOSTEAL FRACTURE OF THE METATARSUS.

By PROF. L. A. MERILLAT, CHICAGO VETERINARY COLLEGE.

Subperiosteal fractures (fractures without displacement) occur occasionally in the extremities of horses, but it is usually the tibia and the radius that sustain this injury. A kick on the internal face of the tibia or the anterior face of the radius just above the carpus is always looked upon suspiciously by the knowing practitioner, for what at first seems to be only a simple abrasion of the skin often proves to be a serious fracture of the bone by the sudden separation of the broken segments two or three weeks later when the inflammation by softening the periosteum allows the fragments to collapse.

The writer has recently observed a case of this character on the metatarsus. The subject—a horse—received a kick on the antero-internal part of the lower third of the metatarsus and after three days' rest returned to work still slightly lame but able to withstand the ordeal of drawing his share of a large truck. The claudication, however, increased from day to day and at the end of fourteen days the horse was thought too lame to work. A few days' rest restored him to apparent usefulness—the lameness had again disappeared. On the morning of the eighteenth day when the teamster entered the stable expecting to hitch him into the team the leg was found dangling from a compound, oblique fracture of the metatarsus, and for the first time realized that the apparently trivial abrasion of the skin was in reality a serious injury that had fractured the bone.

SUCCESSFUL TREATMENT OF PURULENT SYNOVITIS.

BY R. W. GANNETT, D.V.M., NEWARK, N. Y.

While I was House Surgeon at the Berns Veterinary Hospital, Brooklyn, N. Y., Dr. Berns removed about three inches of the flexor pedis perforans tendon at the hock in a desperate case of suppurating tendon sheath. Opening the sheath freely, disinfection having proved of no avail. Recovery followed in a comparatively short time. There was a certain amount of lack of control of the foot when off the ground, but no lameness.

Recently I was called to see a mare which had sustained a severe kick on the outside of the hock. Splinters of tibia were removed. The flexor pedis perforans synovial sheath was found open and infected. The animal was very lame. Temperature 103° F.; no appetite. The leg was swollen considerably.

Treatment.—The sheath was laid open for about four inches on the outside of the hock and for about three inches at its lower portion on the inside of hock. A quantity of pus and synovia escaped. Tincture of iodine and 2 per cent. carbolic solution were injected faithfully for three weeks. Meantime, the patient was growing steadily worse, being scarcely able to stand with the aid of slings, and when down was unable to arise. After guiding the probe-pointed bistoury into position through the outer opening I severed the tendon, but removed none. Pain and fever ceased, in two or three days, appetite returned and an uneventful recovery took place in about four weeks. There is the same swinging or lack of control of the corono-pedal articulation when the foot is off the ground; but no lameness at farm work.

RELAPSE AFTER APPARENT RECOVERY IN AZOTURIA CASE.

BY MARK WHITE, V.M.D., DENVER, COLO.

Horse attacked with azoturia 2 p. m.; apparently well at 6 p. m. and no signs of any physiological disturbances, walking normal, and muscles of hind quarters soft and normal in size. 7 a. m. the following morning horse again showing typical symptoms of azoturia, stiff in hind legs, and paralyzed in near

fore leg. When attempt was made to turn horse around he fell to the ground, apparently giving away and falling to the front. On examination I found great toxic disturbances with paresis of the hind legs, urine slightly discolored, which showed great discoloration the day before. The horse received a good physic during the night and was able to make his urine from the first. This horse lived until the second night following, being placed in a sling and let down as often as he showed discomfort.

The point of interest in this case is the long period of time which elapsed before the horse went down, the paralysis of the front leg and the apparent recovery and re-attack when the bowels and kidneys were all well opened, the gluteal muscles normal and soft.

FOOD FOR SQUIRRELS.—Most people who feed the gray squirrels in the big parks fail to realize that it is no kindness to give these pretty little animals such soft shell nuts as almonds, peanuts and chestnuts. Human beings who do not have to actually forage for food naturally enough feel that it is thoughtfulness itself to save the squirrels work. The fact is, however, that a squirrel's teeth grow so rapidly that, deprived of their normal use, they might even through their very uselessness become long enough to put this charming rodent of the trees in danger of starvation. Hickory, pecan and hazel nuts are the proper food to throw to the squirrels.—(*Exchange.*)

TAKING THEIR TEMPERATURE.—For three days on a transatlantic cattle steamer, with passenger accommodations, Mrs. Billings had been endeavoring by persistent and continuous questionings to obtain some ideas as to nautical proceedings, and the other passengers had about reached the end of their patience.

"Well," remarked Miss Talbot at dinner as she passed the salt, "I am glad to find that they treat the cattle so humanely on board. Why, they take the temperature twice a day regularly."

"Oh," cried Mrs. Billings in a high, piercing crescendo, "do they really? I'm so glad to hear it, but I shouldn't think they could very well."

"Why not, madam?" inquired an elderly man on her left.

"Well—well, why," said Mrs. Billings, "I should think that it would be hard to keep a clinical thermometer in a cow's mouth long enough to get any temperature without having it crushed."
—(*Youth's Companion.*)

ARMY VETERINARY DEPARTMENT.

WHAT BENEFIT CAN WE DERIVE FROM THE GENERAL STAFF BILL?

In response to the above query, coming to me from different army colleagues, I gladly quote Sec. 4 of the Bill: "That the veterinarians appointed under this act shall be on the same footing as commissioned officers of the Army as to tenure of office, retirement, pensions and increase of pay, and in all respects shall be governed by the rules and Articles of War as are commissioned officers of the Army."

Remember that we are mortals, and that the following "honor-roll of our dead" comprises all young men except one: 1. Dr. Albrecht Heusinger (Germany) 7th Cavalry, killed by the Sioux in Yellowstone Valley, 1873. 2. Dr. Samuel Going, M.R.C.V.S., 1st Cavalry, killed in the Nez Perces War, 1875. 3. H. Humphreys, V.S., 2d Cavalry, died from wounds, 1885. 4. M. J. Treacy, M.R.C.V.S., 8th Cavalry, died from yellow fever, Cuba, 1899. 5. Dr. Samuel Gelston, 3d Cavalry, insane from sunstroke and bolo cut over head, disappeared, Philippines, 1901. Dr. Paul Gettler, Q. M. Department, died from abscess of liver, P. I., 1901. In addition we lost from time to time, a number of capable men, who resigned as unfit for further military service to save their lives, some of whom have long since gone to eternal rest; while others, still living, are reminded by continuous pain of hardship and perils undergone. We were never more than twelve up to 1899, and not more than eighteen as late as the Philippine campaign. Figure the percentage of loss and reflect. Even now we have "our own four," of whom one has only one leg and the other three are physical wrecks from amoebic dysentery, and for whom we seek the "amendment" to this Bill. As for the dreaded section which "eliminates," this will be found in any other veterinary Bill.

No further comment is necessary, as I do not want to preach a sermon. But I am pleased with one cool-headed young man among us, who writes me: I shall favor this Bill when the time comes to consider it. "At present I want a change in our status, *and want it quick.*" I second this common-sense motion.

O. S.

A NEW PUBLICATION OF THE VETERINARY DEPARTMENT, BRITISH ARMY.

A book of special interest to our army veterinarians and entitled: "*Animal Management*. 1908. Prepared in the Veterinary Department, for the General Staff, War Office," has recently been published. The contents are as follows:

I. Animal structure and function. II. The points of the horse, colors, markings and age. III. Stable construction and fittings. IV. Stable management, grooming, washing, clipping, clothing, methods of securing, bedding, stable tricks and vices, daily routine. V. Foods, feeding and watering. VI. Management of horses in the open, condition and exercise, marching, feeding, swimming, watering, picketing. VII. Saddles and sore backs, collars and sore shoulders. VIII. The foot and shoring. IX. Transport by rail and sea. X. The mule, donkey, camel and ox. XI. The prevention and first aid treatment of disease. Plates of grasses, herbage and weeds, are added in a pocket.

It is impracticable to fully review this book, consisting of 370 pages of closely printed matter and liberally interspersed with fair wood-cuts. Briefly, it may be stated, that it is evidently intended for officers of the mounted service of the British Army, because it is elementary, avoiding technical terms in the text and explaining subjects that are familiar to every graduate of a veterinary college. Yet, there is also a mass of matter that is more or less unknown to the young veterinarian who enters the army service, because it cannot be taught in a college that does not make a specialty of training veterinary students for the army. The novice in this service, after reading the book, will feel that he knows something of what will be demanded of him, and he will be spared many of the painful pitfalls which he prepares for himself either by his own overwillingness or by his ignorance of the real object in view. The more experienced army veterinarian will find, every now and then, subjects touched upon which remind him of the hours and days spent in anxious study, in close observation or experiment to discover for himself the secrets that are here nicely laid bare. Three chapters are of special merit. That one "saddles and sore backs, collars and sore shoulders," is a masterful exposition of the subject, the best I have read in English, French or German. "The mule, donkey, camel and ox," explains much that we were trying to learn in our Philippine campaign when the "carabao and the

zebu trotting bull" were burdened upon us as new charges, thousands of them being used for transportation by our Quartermaster's Department. The book commends itself generally for its simple, lucid style, and furnishes most entertaining reading for several evenings.

There has never yet been written a book on "*Military Veterinary Science*," one that is intended for veterinarians only, a truly scientific book that no army officer would care to read. It is very desirable and necessary that these officers should know something of our science, and the more they know the better they co-operate with us in the practical ends to be attained. Yet, the subjects of military veterinary hygiene, military veterinary surgery, military veterinary history, etc., have all been separately treated in a scientific manner by English, French and German veterinary officers, and it would seem that the time is on hand when all these subjects could be gathered together into one comprehensive, technical treatise, and we would encourage our British Army colleagues to make an attempt.

In the meantime, we heartily approve of this book and recommend it to our army veterinarians. It is for sale by: Wyman & Sons, Fetter Lane, London. Price: One shilling and sixpence. Perhaps it can be had through W. R. Jenkins, 851 Sixth Avenue, New York City.

OLOF SCHWARZKOPF.

THE only serious and formidable thing in nature is will.—
(*Emerson.*)

SIXTH SENSE IN BIRDS.—In the animal kingdom the birds seem to be really the class most highly favored by nature. Though they are not placed near the summit of the line of evolution, their ability to fly marks them off as having some advantages over nearly all the mammalia. Their mysterious power of changing their polarity or weight in order to dive in water or soar in air has been often discussed, and the almost incredible velocity of their motion when migrating, sometimes amounting to four miles a minute for vast distances, has no parallel among other animals.* In addition, experiments with carrier pigeons at night demonstrated beyond doubt that these birds at least possess a highly developed sense of direction.—(*New Century Path.*)

ABSTRACTS FROM EXCHANGES.

ENGLISH REVIEW.

By Prof. A. LIAUTARD, M.D., V.M.

SARCOMA OF THE LIVER [*E. Wallis Hoare, F.R.C.V.S.*].—A twelve-year-old Irish terrier dog has since a week an extensive enlargement of the abdomen, but until then has always been in good health. He is much emaciated, the abdomen is not painful, ascitis is evident and a solid enlargement is also felt in the abdomen. Tapping on the median line is not followed by escape of fluid. This operation performed in various places is again without result. No sickness is manifested by the animal, nor pain but the enlargement of the abdomen seems to increase. The dog is found dead one morning in his kennel. On opening the abdomen a tumor was found attached to the spleen and another on the mesentery. There was a large amount of fluid in the abdominal cavity; dark-yellowish in color. The liver resembled an enormous tumor with irregular nodules on its surface. These were whitish in some parts and of a marbled appearance in others. The whole organ weighed five pounds. The neoplasm was a typical spindle-celled sarcoma.—(*Veter. News.*)

DOUBLED TELESCOPED INTESTINE ACCOMPANIED BY TWIST [*H. Thompson, M.R.C.V.S.*].—A foal is found very ill one morning. He was a colt, twelve weeks old, running with his dam in a field. That morning he was found lying on his back, propped up by a fence. Pulled away, he jumped up, but laid down again, assuming the same position, on his back, when he seemed to have much relief. Notwithstanding treatment, he dies in four hours. Post-mortem revealed a beautiful twist of the intestine, one portion of the gut overlapping the other in form of a half knot. On examining this part, it was found to be telescoped and that the invaginated portion measured six feet and two inches in length and besides this, the latter part of this telescoped portion was doubly telescoped to the extent of two feet and 2 inches.—(*Veter. News.*)

COLD WATER TREATMENT FOR OPEN JOINTS [*H. Thompson, M.R.C.V.S.*].—A horse got his legs entangled in some barbed wire and received an extensive jagged wound in front of the bend of the hock. The synovial bursa was torn and synovia escaping freely. Following his usual form of treatment in similar cases, cold water irrigation was applied continuously for a week and then stopped, when the wound was filled with healthy granulations and synovia had ceased to run out. In about two weeks all lameness had subsided and the wound dressed with iodoform, charcoal and pulverized sulphate of copper to keep the granulations down.—(*Veter. News.*)

SOME EXAMPLES OF MALIGNANT DISEASE IN ANIMALS [*J. Burton Cleland, M.D., Western Australia*].—These examples of cancerous conditions show the widespread geographical distribution of such diseases.

CARCINOMA OF THE BREAST OF A LIONESS.—Found in an animal that died in the zoological garden of Perth, at about the age of ten years. In the lower part of the breast there was a hard dense scirrhus mass about the size of the palm of the hand. The right sublumbar gland was enlarged. There were numerous secondary growths in the lungs, liver, spleen and omentum. One of the kidneys was also diseased.

CARCINOMA OF THE UDDER IN A DAIRY COW, large scirrhus-looking mass in the udder and secondary deposits in the iliac and sublumbar glands.

SQUAMOUS EPITHELIOMA OF THE PERINEUM OF A COW, a large cauliflower like papillomatous mass projected from the perineum, firm with some yellowish granular areas.

EPITHELIOMA GROWING FROM THE CONJUNCTIVAL SURFACE OF LOWER EYE-LID OF A HORSE, displacing the globe. Probably originated in one of the gland appendages of the skin.

ALVEOLAR SARCOMA OF THE MEDIASTINUM IN A BULLOCK. A big lobulated mass as large as an infant's head, covering the base of the heart to the left side and in front of the auricles and large vessels. On section it was moderately firm with scattered extravasation of blood.

CARCINOMA OF SUPRA RENAL GLANDS OF SHEEP. The right supra-renal gland was enlarged, rounded, white, hemorrhagic and adherent to the kidney below and to the liver above. There were some nodules in the liver and in both lungs.—(*Journ. of Comp. Pathol. and Therap.*)

CASE OF ATAXIA IN A HORSE [*Capt. Jolliffe, M.R.C.V.S.*].—After being ridden some distance, to reach a certain place, a horse is found seriously ill, he is extremely exhausted and walked back to his stable with great difficulty, supported on either side. His weakness and exhausted condition with high temperature and a rusty nasal discharge justified a diagnosis of influenza for which he was placed under treatment. He rallied and was progressing favorably when towards the 14th day after the attack, all signs of constitutional illness having disappeared, he showed loss of co-ordination of the muscles of the legs and a consequent ataxic gait. He walked with his hind legs apart, in a marked ataxic manner. The legs were raised unnecessarily high. The tail was weak and could be raised without resistance or difficulty. The forelegs also seem to be unsteady but not as much as the hind ones. Covering of the head and eyes increased the amount of ataxia and the horse had great difficulty in turning, and the unsteadiness was greater. No alteration in the sensations could be demonstrated. The knee and ankle jerks could not be obtained. The sphincters were normal. Although the general condition was good, all the treatments used having failed (iodide of potassium, biniodide of mercury, strychnine counter irritation, etc.), the animal was destroyed. At the post-mortem, nothing could be detected in the spinal cord and brain, except when the specimens were stained by the Marchi's method, when various degrees of degeneration were found in the posterior columns and in the anterior tracts. The specimens were taken in mid-thoracic region, upper cervical and lumbar.—(*Veter. Jour.*)

TWO INTERESTING CASES OF TUBERCULOSIS [*Prof. F. Hobday, F.R.C.V.S. and E. Belcher, M.R.C.V.S.*].—1st Case: In a five-year-old bulldog; has never been ill, never run out in the street, had no possibility of heredity from its family, had as a rule never had any milk, lived on meat cooked in the house, no members of the family where he was had been known as consumptive. The manner he was infected remains a mystery. His coat was harsh and staring with an unpleasant smell. Occasionally he seemed to have "heart pains," breathed heavily. Auscultation of the heart gave muffled sounds; pulse irregularly intermittent. Nothing definite is arrived at and at the request of the owner the dog is killed. Post-mortem: Pericardium much thickened, and adherent to the heart in several places. Fibrous

tumors, not caseous, exist in the muscular heart structure; they are irregular and flattened. Over the left auricle, there is a sac formed by the pericardium, whose inside is studded with tubercles, distinctly caseous. There were also nodules in the spleen and the mesenteric glands. The case was one of tuberculosis.

2d Case: Female cat had a swelling in the parotid lymphatic glands, which was treated as an abscess. After a while, the sub-maxillary gland, then the prepectoral and finally the precrural became enlarged. The cat was destroyed as suspect of tuberculosis. At autopsy, scarcely any organ could be found which did not contain tuberculous lesions. The pleura, the lungs, thoracic and abdominal lymphatic glands were all full of caseous tubercles in which the microscopic examinations revealed large number of bacilli.—(*Veter. Journ.*)

DESTROYING A DOG WITH MORPHIA [*Henry Taylor, F.R.C.V.S.*].—A dog was, at the owner's request, going to be destroyed. The author injected sub-cutaneously 4 and $\frac{1}{2}$ grains of morphia which he followed by 4 more a few minutes later. In fifteen minutes after the dog received 8 grains more through the right intercostal region into the lungs. The animal was in deep sleep but did not show any indication of dying soon. Then every ten or fifteen minutes doses of 5 and 6 grains were given until not less than 45 grains had been administered. At last convulsions followed by coma took place and the dog died, but not until an hour later.—(*Veter. Journ.*)

RUPTURED COLON AND OLD-STANDING PERICARDITIS [*C. Powell, M.R.C.V.S.*].—Five-year-old gelding had colic and as he gets worse the author is called and finds the horse in great pain and restless. Temperature is normal, there is slight tympany, the mucous membranes are rather pallid. The most noticeable feature of the case is the distressed character of the breathing, which is accompanied with an haggard expression of countenance very peculiar. Respirations were quick and short, nostrils dilated, pulse quick, small and irregular. Sounds of the heart seemed very muffled in character. Lungs normal. Purge, stimulants and enemas are prescribed with chloral to be given as needed. Next morning the horse seems better. Another examination reveals the same condition as before. Temperature has risen two degrees. Later the body gets covered with cold, clammy sweat. The horse dies. At the post-mortem there was found lesions of

acute peritonitis with a rupture of the colon. And, on opening the chest, the heart was seen adherent to the right side of the chest wall, by adhesions which existed between a large portion of the surface of the right ventricle, the pericardium and two ribs, which had at some previous epoch been fractured; the ragged ends piercing and lacerating the pericardium and also the heart itself as evidenced by an old cicatrix.—(*Veter. Journ.*)

CASES OF CHOREA IN HORSES [*Joachim Da Costa, C.B.V.C.*].

—No. 1. Brown country-bred entire, six years, very spirited, worked on a sandy road, dragging with his mate for a distance of four miles, a wagon that had one of the wheels stuck fast. As a consequence, he was all in a perspiration, very tired, and in being unharnessed he fell on the ground in a semi-conscious state. Stimulants, hand-rubbing, etc., brought him to and in a few hours he seemed alright. The next day, he began pawing his forefeet and showed soreness on the slightest pressure on the shoulders. On the third day he had an involuntary spasmodic contraction of the levator humeri muscle. Spasms coming on at intervals whilst standing, walking and lying, or again by raising the head, frightening the animal or touching the sore parts. The general condition was otherwise good and the temperature normal. Electuaries of belladonna and camphor were given for a week. Spasms and pawing stopped but returned after four days. Same treatment for one week longer gave the same results. Then to the electuary treatment, full doses of bromide of potassium and bicarbonate of soda were added, bringing a good permanent and satisfactory result.

No. 2. Bay colt, three years old, was forced to run with his mother for a long distance and in state of perspiration was given a wash in a river. He refuses his food, shivers and is treated by the owner. Soon, however, he is taken with sudden involuntary contractions of the abdominal muscles. The spasms are seen far from him, flattening the abdomen each time and a sudden gush of air felt at the nostrils synchronous with the convulsive movements of the abdomen. The animal was submitted to the same treatment as the preceding, camphor, bromide and bicarbonate, and recovered in a little over two weeks.—(*Veter. Record.*)

FRENCH REVIEW.

By Prof. A. LIAUTARD, M.D., V.M.

TREATMENT OF TOE CRACKS BY TWISTED SUTURES OF THE WALL [*Mr. Mouilleron*].—This treatment is only indicated and can only be applied to animals which have been operated by the classical method by the thinning process or again in those when after a complete operation, the cicatrization of the soft tissues is complete and already protected by a thin layer of new horn, and when the repair is sufficiently advanced to avoid all secondary infection. The object of the treatment is specially to favor the cicatrization in immobilizing the foot and to avoid the annoyance of ordinary protecting dressings which in time promote atrophy and contraction of the foot. The treatment is as follows: On each side of the thinned surface, beginning as near the coronary band as possible, four nails are driven through the thickness of the wall as in the method of treatment called "barring of the crack," and when the point of the nail appears on the level with the thinned portion of the wall, the other point of the nail, which is the head, is cut off a short distance from the point of implantation. A pad of oakum or wadding with hoof ointment, tar or like ingredient, is laid in the hollow of the front part of the hoof and a solid malleable wire is passed in figure 8 style round the first, then the second nail and so on, as is the thread, silk or wire used for twisted suture. The ends of the two wires are twisted together and cut short. The dressing can remain for months before it needs to be renewed. Claims of the author: It gives complete immobilization, preserves the integrity of the foot, prevents deformity and removes all danger of contraction. It reduces the indisposition of the animal to its minimum, gives a perfect solid dressing and is unusually easy of application.—(*Bullet. de la Soc. Cent.*)

DIABETES IN ANIMALS [*Mr. Bru*].—The author relates his observations of this disease in two cows and three dogs.

In the first, cow he has noticed that the disease progressed very rapidly and that all treatment was entirely useless. In one cow there was no polydisy but frequent efforts for micturition with evacuation of only a small quantity of urine. In the other case the animal drank with avidity and always a large

quantity of fluid, and when returned to her stall she would frequently, after a few moments, stretch herself to urinate and then expel only a very small quantity of urine. In neither of these two cases were ocular manifestations noticed. Both animals died in a very short time. In the observations of the dogs, one had great thirst and was blind in both eyes by cataract. In another there was evacuation of large quantity of urine, reddish in color. There was also loss of sight, no polydisy. In the third was noticed great thirst, abundant urination and difficulties of sight. The march of the disease in dogs is relatively slow, animals can live awhile but the troubles of the sight render them useless.—(*Rev. Veter.*)

DENTAL ABNORMALITIES [*M.M. Bourdelle and Darnaud*].—Among dental abnormalities, some are characterized by the presence of one or several teeth being implanted in the bony structure of the palate. Palatine teeth, as they are called, are the object of the two following records. In one the abnormality consists in two second dentition incisors (nippers) situated 4 or 5 centimeters back of the incisive arch, which is otherwise perfect. These abnormal teeth are resting side by side, on each side of the median line, implanted vertically in the palatine roof. They are well formed, with an external dental cavity and resemble perfect teeth of second dentition. At the time the animal had them, they did not seem to disturb him, but later they may and will have to be pulled out. (Why wait until then?)

The other case was observed in the upper jaw of a shepherd dog in which existed a strong palatine canine implanted obliquely and transversally from right to left in the palatine roof back of the incisive openings. It was no doubt the left canine which in developing made its way out of its ordinary location. In other words, teeth may be truly supernumerary teeth as in the first case or again teeth which are displaced from their ordinary location.—(*Rev. Vete.*)

TEMPORO-MAXILLARY SUPPURATIVE ARTHRITIS IN A COW [*Mr. Bonnet*].—About a week after a normal delivery and cleanings, a cow cannot feed. Temperature and respiration are normal, general condition satisfactory and vaginal exploration shows that everything is normal in that direction. Failing to make a positive diagnosis, tonics are prescribed and for a while the animal shows some improvement. But this does not last

and soon the animal again refuses all kinds of food, solid, liquid, dry or green; she loses flesh, her milk diminishes and yet she has no fever and appears as gay as usual. However, new manifestations are soon present. The cheeks are swollen, thready saliva escapes from the mouth and on examination of that cavity, the lingual canal and the inside of the cheek are found literally packed with food, scarcely chewed and having a strong odor of maceration. Extracted, this weighed two kilograms. Relieved of this mass, the animal takes some liquids, but when she is offered solids, she tries to take it and cannot. Another examination of the mouth is made and is negative. However, outside on a level with the left temporo-maxillary joint a small swelling is observed, diffused, not very painful, hard and not warm. A blister is applied. But the animal does not improve, she loses ground and is destroyed. The lesions found consisted in swelling of the bronchial lymphatic glands, containing yellow pus, very offensive. And an abscess in the left temporo-maxillary joint, with foetid pus similar to that of the bronchial glands; the cartilage of the articular surfaces was necrosed and the articular surfaces much roughened and soft. No other lesions were found in any part of the body.—(*Journ. de Zootech.*)

TREATMENT OF TETANUS WITH OXYGENATED WATER AND INJECTIONS OF ANTITETANIC SERUM [*Mr. Dabert*].—A horse is taken with lock-jaw, probably sequela of a punctured wound of the foot. Treatment, quietness, obscurity, and in the morning 10 c.c. of serum. The disease progresses and after three days one litre of oxygenated water at 12 deg. is ordered to be taken in two doses. The animal is worse the next day; he receives sulphate of eserine, three injections of serum and two litres of oxygenated water. The horse improves, has a relapse after a week and the same treatment is started again. Soon convalescence sets in and slowly the animal recovers.—(*Journ. de Zootech.*)

COMPLETE UTERINE TORSION IN A COW WITH RUPTURE OF THE RIGHT HORN, DUE TO TRAUMATISM [*Pierre Bitard*].—A six-year-old pregnant cow is eighteen days behind her time. She has colic for past two days and has been treated by an empiric until in great danger of dying, then the author is called. She is standing up, raising now and then one hind leg, specially the right. Her features are contracted, the head carried

low, eyes are sunken, the vertical fissure back of the zygomatic process is much marked (an alarming symptom, says the author). Respiration is accelerated, heart beats strong and repeated, pulse small, filiform 106, temperature 38.3°. Abdomen is very large, flanks hollow. Repeated palpation of the abdomen fails to reveal anything about the foetus. Vaginal exploration detects a complete torsion of the uterus to the left. The twists are numerous and prevent the introduction of the hand beyond it. Rectal examination shows that the vagina is also involved in the torsion and permits feeling a solution of continuity, which is supposed to be on the right horn. The calf cannot be detected. The cow is condemned and slaughtered. The torsion is readily exposed, a large quantity of fluid escapes from the horn, perhaps 70 litres, there is also a great quantity of serosity in the abdomen. The right horn is very large, hard, black in color and has on its superior face a solution of continuity, which involves the serous and muscular coats. The mucous membrane is infiltrated and forms a large hematoma in the uterine cavity. The accident was the result of heavy falls sustained by the animal.—(*Progres Veter.*)

RECTAL CYST IN A MARE [*Mr. Douville, Adjunct Professor-Alfort*].—After suffering with dull and intermittent colics for some time, without gaining a permanent relief, an eight-year-old mare was brought to the attention of the author. After being put in a stall where she began to eat, the mare stops suddenly, and colicky symptoms are manifested. With difficulty, she passes some hard and dry balls of manure and suddenly as the last ball drops out, there appears a red mass which, it is said, has been noticed lately by the owner. The tumor is regularly spherical, the size of a child's head, it fills the space between the vulva and the base of the tail, which is kept elevated and pushed to the left. The mucous membrane is red and has some superficial abrasions. The tumor is painless and gradually subsides by moderate pressure applied on it. By rectal examination, the presence of the cyst is readily detected on the superolateral wall on the right side of the rectum; and when gradual pressure is put on it, its contents is felt running backwards and downwards alongside the arm of the explorer, and at the same time, goes and collects near the anus, where it forms a projecting cord. An exploring needle was introduced and 800 grams of fluid removed. The cavity was then filled with a solu-

tion of tinct. of iodine, iodide of potassium and water. After proper massing of the growth, this mixture was withdrawn. The mare was relieved for two days of her colic, when they returned and a second operation had to be done. This was followed by immediate and permanent disappearance of all difficulties.—(*Rec. de Med. Veter.*)

ITALIAN REVIEW.

By Prof. A. LIAUTARD, M.D., V.M.

A RARE CASE OF THE ABNORMAL DELIVERY OF A MONSTROUS FŒTUS [*Dr. Guido Finzi*].—The author was called to assist in a peculiar case of accouchement of a cow. Aged six years, the animal has had several normal parturitions before and was in excellent condition. When first taken in labor, she presented nothing abnormal, but soon after she has violent and frequent pains and she made powerful efforts without any results. The water bag had burst, the pulse became accelerated, the vulva swollen and the vaginal mucous membrane highly congested. Vaginal exploration revealed the severity of the case, as the four extremities were found at the uterine opening. Was it a right or a left cephalo-iliac position could not be made out? The conformation of the fœtus was certainly abnormal and its size enormous. To distinguish the fore from the hind legs was also very difficult on account of their anatomical conformation and of their special position. With difficulty a cord was secured to two of them and tied up as high as possible, whether the hock or the knee. Finally, the fœtus was extracted, no less than eight men being required to pull on the rope. The cow after two days was well and ruminating. The fœtus was a monstrous individual. The rachis was flexed in the opposite direction than normal and the extremities much distorted, instead of being implanted so as to come together under the abdomen, it did on the back. The external conformation of the carpus and of the tarsus was almost identical, hence the difficulty in distinguishing them by manipulations within the uterus.—(*La Clin. Veter.*)

SOME RARE CASES OF ECHINOCCOCCI IN BOVINES [*Doct. Agostino Toderi*].—Cases of echinoccoci are rather frequent in

bovines and are detected at post-mortems by the meat inspectors. They are found principally in the lungs and the liver and also more rarely in the spleen, the kidneys and the heart. The author has observed one case in a steer which had one cyst of echinococci occupying completely the left ventricle of the heart. As the case was discovered at the meat inspection, the effects of this condition of the heart upon the circulation remain unknown. Doct. Toderi relates two cases. In one with the animal in excellent condition, he found the parenchyma of the lungs full with echinococci and also the costal and visceral pleura. The sternal pleura was covered with them. They varied in size from that of an apricot to that of a large pomegranate. The liver was enormous and weighed 56 kilograms. It was full of cysts. In another case the lungs and the sternal pleura were extensively involved. All the other organs were healthy.—(*Archiv. Scient. della Acad. Veter. Ital.*)

THREE CASES OF POLIDACTILY [*Drs. Alete Borella and Guido Finzi*].—The first was in a two-year-old colt, which had no record of abnormality in his pedigree. The posterior legs were normal and perfectly straight, without any blemishes of any sort. The forelegs have a normal aspect as far as the fetlock when the digital region is bent a little outwards. On the internal surface, between the inner rudimentary metacarpus and the fetlock there are two supplementary digits. These are well developed, having three phalanges, two horny feet and a coronary band. The foot is moderately well formed and resembles much the toe of cattle. The supplementary digit is ankylosed with the metacarpus, but the interphalangeal joints are not. The animal can walk without difficulty, but when trotting stumbles and is liable to fall.

The second case was also in a colt which had the same abnormally, viz, two supplementary digits on the forelegs. These have also three phalanges, a foot smaller than the normal one and having the form of the claw of cattle. This is elongated and curved towards the principal toe. The articulation with the internal metacarpus and the interphalangeal joints are moveable. The colt walked and ran without any impediment. His mother had on the internal face of the right foreleg just below the rudimentary metacarpus a small osselet which represented a first phalanx.

The third belongs to a pig. It consisted in a supplementary digit entirely developed also.—(*La Clin. Veter.*)

LAMENESS IN A HORSE DUE TO THE REPAIRING PROCESS OF A MUSCULAR LACERATION [*Dr. Ruggero Fracaro*].—While being led by the bridle, a saddle horse, seven years of age, became suddenly lame on the left hindleg. A little below the point of the rump, there was a large swelling, spherical, not very warm, nor painful, rather elastic to the touch, and having a certain amount of fluctuation. It looked like an hematoma or a traumatic exudation of serosity. Below the swelling was a marked depression or hollow indicating a solution of continuity in the muscular mass of the long vastus and semi-tendinosus.

How did this occur? Could not be found out. However, by proper treatment of cold water applications first and blistering afterwards, the acute symptoms subsided, the effusion resorbed and the animal returned to work in due time.

Some three months later, he was again disabled, on the same leg. His lameness being characterized by a difficulty in carrying the leg forward, the action being interfered with by the presence of a cord on the seat of the old lesion filling the old laceration and having the size of the thumb of a man's hand. It was an organized cord formed by the cicatrized connective tissue and the muscular fibres. Relief could certainly have been obtained by a sub-cutaneous division of the cord, made with a blunt myotomy knife, but the animal was sold and lost sight of.—(*La Clin. Veterin.*)

A FATAL KICK.—Joseph Coggins, of Ashford avenue, while attending a sick horse on Friday last was kicked in the face, requiring six stitches to sew up the cut. The horse, which was a valuable animal, died later from colic.—(*Dobbs Ferry Register.*)

HE EXPLAINED.—At a school one day a teacher, having asked most of his pupils the difference between an island and a peninsula without receiving a satisfactory answer, came to the last boy.

"I can explain it, sir," said the bright youth. "First get two glasses. Fill one with water and the other with milk. Then catch a fly and place it in the glass of water. That fly is an island, because it is entirely surrounded by water. But now place the fly in the glass of milk, and it will be a peninsula, because it is nearly surrounded by water."

The boy went to the top of the class.

CORRESPONDENCE.

AUTOMOBILE DISCARDED FOR THE HORSE.

DENVER, COLO., Dec. 12, 1908.

EDITORS AMERICAN VETERINARY REVIEW:

Gentlemen: For the benefit of my brother colleagues that may be contemplating the purchase of an automobile to displace the horse in their practice, I desire to give them this "tip." I have used a machine for the past months in my practice in Denver; I drove a machine 23,000 miles at a cost of \$2,500. I found the automobile wholly unreliable for my business, and very expensive. If I saved an hour to-day, I would lose two to-morrow; in other words, after figuring the time lost on account of breakdowns, tire troubles and necessary adjustments, and the time the machine was in the shop that I really did not save any time, but that I was losing much valuable time. I found that when it became necessary to go to the shop for repairs that I fell in the hands of men without any conscience or honesty. They would work on my car one hour and probably charge for two or three, at the rate of 75 cents per hour.

I found that the auto did not equal the horse on muddy or sandy roads or in rainy or cold weather. It requires more thought to keep up with the running of the machine and keep it all together than it does to look after one's practice, or study how to make a living therefrom. A doctor, in my judgment, needs to think over his cases and business when he is traveling from one to the other during the day, but it is impossible to do so when running a machine, for it must have your entire thoughts. *An automobile will consume the profits of a medium business.* No man can afford to use one from a business standpoint, they can only be looked upon from a luxury viewpoint. The automobile can only be afforded by the rich. There will be a reaction within the coming year back to the horse, since every one that has the auto fever must buy an auto, or two, before he opens his eyes to what a fool he has been to spend two or three thousands of dollars per year just for something to get around the country with, when formerly he only paid twenty or thirty dollars for a horse per month. Great good will come

through the auto fever; that is, the people will not be satisfied any more with a common horse, or buggy, but they will buy a four or five hundred dollar horse, where they formerly bought a hundred dollar one.

The automobile causes the people to lavish and squander their money and makes them extravagant. I am using the horse again with more satisfaction and comfort than ever before. It is all a mistake to believe that a doctor can turn off more business with the machine than he can with the horse. He cannot do it.

Respectfully yours,

MARK WHITE, V.M.D.

THE BRAKEMAN'S JOKE.—“Ran over a cow this morning up above Coffeyville,” said the brakeman to a reporter.

“How did it happen?” asked the reporter.

“She was drinking out of a creek under a bridge,” shouted the brakeman as he swung on to the last car and went grinning out of town.—(*Kansas City Times*.)

GOAT'S \$15,000 MEAL.—A peasant followed by a goat walked into the local bank at Aurillac to pay in some money. As he was going out a clerk noticed that the goat had a piece of paper in his mouth.

He vaulted over the counter and caught the animal just in time to prevent it swallowing a bond worth £3,000, which it had nibbled off the counter.—(*London Evening Standard*.)

THE SAW OF THE MOSQUITO.—The bill of the mosquito is a complex institution. It has a blunt fork at the head and is apparently grooved. Working through the groove and projecting from the angle of the fork is a lance of perfect form sharpened with a fine bevel. Beside it the most perfect lance looks like a hand saw. On either side of the lance two saws are arranged, with the points fine and sharp and the teeth well defined and keen. The backs of these saws play against the lance. When the mosquito alights, with its peculiar hum, it thrusts its keen lance and then enlarges the aperture with the two saws, which play beside the lance until the forked bill with its capillary arrangement for pumping the blood can be inserted. The sawing process is what grates upon the nerves of the victim and causes him to strike wildly at the sawyer.—(*Exchange*.)

CIVIL SERVICE EXAMINATIONS.

EDITOR.

OFFICE OF EXPERIMENT STATIONS, DEPARTMENT OF AGRICULTURE.

The United States Civil Service Commission announces the postponement to January 6-7, 1909 (in view of the small number of applications filed), of the examination scheduled for November 24-25, 1908, at the places mentioned in the list printed by the Commission, to secure eligibles from which to make certification to fill a vacancy in the position of editor in charge of the departments of entomology, economic zoology, and veterinary science, in the Experiment Station Record, Office of Experiment Stations, Department of Agriculture, at \$1,500 per annum, and vacancies requiring similar qualifications as they may occur in that Department.

The examination will consist of the subjects mentioned below, weighted as indicated:

<i>Subjects.</i>	<i>Weights.</i>
1. Spelling (twenty words of more than average difficulty).	3
2. Arithmetic (fundamental rules, fractions, percentage, interest, discount, analysis, and statement of simple accounts)	3
3. Penmanship (the handwriting of the competitor in the subject of letter-writing will be considered with special reference to the elements of legibility, rapidity, neatness, general appearance, etc.)	3
4. Letter-writing (a letter of not less than 150 words on some subject of general interest. Competitors may select either of two subjects given)	6
5. Copying from rough draft (the writing of a smooth copy of rough-draft manuscript, including the correction of all errors of spelling, capitalization, syntax, etc.).	5
6. Editing and abstracting	10
7. Proof reading and indexing	10
8. Special subject:	
(a) Economic zoology and veterinary science, or	
(b) Animal husbandry and dairying	40
9. Training and experience (rated on application)	20
Total	100

A rating of at least 70 per cent. in the special subject chosen is required for eligibility.

Some knowledge of French and German is required, and the candidate's proficiency in these languages will be considered in the rating for training and experience.

The position to be filled as the result of this examination requires a man of special qualifications, including not only fundamental knowledge in the subject chosen, but considerable advanced training, and general familiarity with its literature.

Two days will be required for this examination.

Age limit, 20 years or over on the date of the examination.

This examination is open to all citizens of the United States who comply with the requirements.

This announcement contains all information which is communicated to applicants regarding the scope of the examination, the vacancy or vacancies to be filled, and the qualifications required.

Applicants should at once apply either to the United States Civil Service Commission, Washington, D. C., or to the secretary of the board of examiners at any place mentioned in the list printed by the Commission, for application Form 1312. No application will be accepted unless properly executed and filed with the Commission at Washington. In applying for this examination the exact title as given at the head of this announcement should be used in the application.

As examination papers are shipped direct from the Commission to the places of examination, it is necessary that applications be received in ample time to arrange for the examination desired at the place indicated by the applicant. The Commission will therefore arrange to examine any applicant whose application is received in time to permit the shipment of the necessary papers.

VETERINARY INSPECTOR.

BUREAU OF ANIMAL INDUSTRY, DEPARTMENT OF AGRICULTURE.

The United States Civil Service Commission announces an examination on January 20, 1909, at the places mentioned in the list printed by the Commission, to secure eligibles from which

to make certification to fill vacancies as they may occur in the position of veterinary inspector, at \$1,400 per annum, in the Bureau of Animal Industry, Department of Agriculture.

As the Commission has experienced considerable difficulty in securing eligibles for filling these positions, qualified persons are urged to enter this examination.

It will be noted that the entrance salary of this position has been increased to \$1,400 per annum, promotion to \$1,600 to be made after two years' satisfactory service at \$1,400, and promotion to \$1,800 after satisfactory service for two years at \$1,600 per annum.

The examination will consist of the subjects mentioned below, weighted as indicated:

<i>Subjects.</i>	<i>Weights.</i>
1. Spelling (twenty words of average difficulty in common use)	5
2. Arithmetic (simple tests in addition, subtraction, multiplication, and division of whole numbers, in common and decimal fractions, and of United States money). ..	5
3. Letter-writing (a letter of not less than 125 words on some subject of general interest. Competitors may select either of two subjects given)	5
4. Penmanship (the handwriting of the competitor in the subject of copying from plain copy will be considered with special reference to the elements of legibility, rapidity, neatness, general appearance, etc.)	5
5. Copying from plain copy (a simple test in copying accurately a few printed lines in the competitor's handwriting)	5
6. Veterinary anatomy and physiology	15
7. Veterinary pathology and meat inspection	30
8. Theory and practice of veterinary medicine	30
Total	100

The last three subjects include general questions on anatomy and physiology, a consideration of the pathology of diseases in general, and such special pathology as is characteristic in diseases common to food-producing animals. The symptoms, diagnosis, and treatment of diseases incident to domesticated animals will be considered.

A competitor who fails to attain an average percentage of at least 70 in the sixth, seventh, and eighth subjects will not be eligible for appointment, and the remaining subjects will not be rated.

Seven hours will be allowed for the examination.

Age limit, 20 years or over on the date of examination.

Applicants must be graduates of recognized veterinary colleges. Those graduating prior to or during 1897 will be admitted if from colleges having a course of not less than two years in veterinary science; applicants graduating since that time must be from colleges having a course of not less than three years and must have taken the whole course or its equivalent, and at least two years must have been spent in the study of veterinary science in such colleges. These facts must be shown in the application.

This examination is open to all citizens of the United States who comply with the requirements.

This announcement contains all information which is communicated to applicants regarding the scope of the examination, the vacancy or vacancies to be filled, and the qualifications required.

Applicants should at once apply either to the United States Civil Service Commission, Washington, D. C., or to the secretary of the board of examiners at any place mentioned in the list printed by the Commission, for application Form 1312. No application will be accepted unless properly executed and filed with the Commission at Washington. In applying for this examination the exact title as given at the head of this announcement should be used in the application.

As examination papers are shipped direct from the Commission to the places of examination, it is necessary that applications be received in ample time to arrange for the examination desired at the place indicated by the applicant. The Commission will therefore arrange to examine any applicant whose application is received in time to permit the shipment of the necessary papers.

THERE ARE OTHERS.—Old Emdee—Well, how do you like your profession?

Young Emdee—Profession is O. K. It's the practice I'm kicking about.—(*Town and Country.*)

OBITUARY.

GEORGE O. FORSYTH, V.M.D.

The sad intelligence reaches us of the sudden death of Dr. George O. Forsyth, veterinary practitioner of Burlington County, N. J. His funeral took place from his late residence at Johnstown, December 19, 1908.

Dr. Forsyth was a successful practitioner, well known throughout Central Jersey. He was a graduate of the University of Pennsylvania and a prominent member of the Veterinary Medical Association of New Jersey.

W. F. CARR, V.S.

It is with deep regret that the REVIEW is called upon to chronicle the sad demise of Dr. W. F. Carr of Bay City, Mich., which occurred Sunday evening, November 15, 1908, at 7.30 o'clock, at Mr. U. M. Guilford's ranch, situate about 20 miles west of West Branch, Mich., where Dr. Carr and a party of friends were on a hunting expedition.

Dr. Carr had shot a fine deer and in the evening, surrounded by his friends, was examining the various kinds of rifles of his associates when one of the fire arms, which was not supposed to have been loaded, went off, the ball striking him in the left breast and going through him. Medical aid was summoned from West Branch and Bay City but he died the same night at 11.30 o'clock. He was conscious, however, up to the last moment of his life and used this precious time to good advantage arranging for the welfare of his wife and attending to a proper adjustment of his business affairs. His body was brought to West Branch and from there to Bay City and thence to Buffalo, N. Y., for interment.

Among those in the hunting party was his old friend, Dr. John Wende of Buffalo, with whom he had been associated in practice until four years ago, when he moved from Buffalo to Bay City. Dr. Carr was a successful practitioner and enjoyed the acquaintanceship of a large circle of friends who deeply mourn his untimely death.

G. A. BARNES, V.S.

The sympathy of the profession goes out to the family and friends of Dr. G. A. Barnes, veterinary surgeon, who is reported to have been burned to death in the destruction of his house by fire, December 10, 1908, at Woodville, East of Toledo, Ohio.

SOCIETY MEETINGS.

KEYSTONE VETERINARY MEDICAL ASSOCIATION.

The regular monthly meeting was held on Tuesday evening, December 8, 1908, in Donaldson's Hall, Broad and Filbert streets, Philadelphia.

Dr. John Reichel occupied the chair. There were present twenty members, several professional visitors and many of the students of the graduating class of the Veterinary Department of the University of Pennsylvania.

Dr. H. C. Campbell was elected a member. The program committee reported the possibility of a helpful schedule of subjects for the year and able and well-known speakers for the meetings.

The evening was devoted to symposium on Foot and Mouth Disease or Aphthous Fever.

Dr. Laycock, in charge of the state control and eradication of the disease at Norristown, very kindly came to the city to address the association. He gave the meeting first-hand information as to the actual conditions of the field work, and detailed the means being pursued in the inspection, control, disinfection and eradication of the plague.

Dr. C. J. Marshall read extracts from the circular on this disease, issued by the secretary of the State Live Stock Sanitary Board, especially emphasizing the wisdom of the "stamp out" method and the characteristic clinical features of the disease.

Dr. John Reichel reviewed what has been so far discovered as to its etiology, and concluded by exhibiting five specimens of the several stages of the disease in cattle and swine—these specimens form part of the collection in the pathological museum of the Veterinary Department of the University of Pennsylvania. The meeting adjourned at 11.20 p. m.

S. LOCKETT, Secretary.

VETERINARY ASSOCIATION OF THE DISTRICT OF COLUMBIA.

The regular monthly of this association was held on the evening of December 16, 1908, at No. 514 Ninth street, N. W.,

Washington, D. C. The president, Dr. John Lockwood, occupied the chair.

Dr. Lockwood brought up the question of recommending the extension of the dog-muzzling ordinance in the District for another six months (the six months' period covered by the present ordinance having expired on the 16th instant). A discussion developed the fact that the largest number of cases of rabies occur during the winter months; also that 200 rabied dogs were discovered in the District during the past six months. Resolutions were adopted recommending the extension of the order for another six months, and the secretary was instructed to forward copies of the same to the President of the United States, the Secretary of Agriculture, and the Commissioners of the District of Columbia.

Dr. H. J. Washburn, of the Pathological Division, Bureau of Animal Industry, then read an extremely interesting and instructive paper on Foot-and-Mouth Disease, which was received with much interest, thoroughly discussed, and a rising vote of thanks was extended the doctor.

The annual election of officers will occur at the next meeting, January 20, 1909. F. M. ASHBAUGH, Secretary.

MISSOURI VALLEY VETERINARY ASSOCIATION.

The semi-annual meeting of this association will be held in Kansas City, February 2 and 3, 1909.

The program will be filled to repletion with up-to-date and current scientific topics. The subject of hog cholera and vaccination and many other absorbing topics of the present time will be presented.

The committee on local arrangements are busy. An excellent clinic is planned for the afternoon of the second day and a banquet for the first evening.

Every veterinarian in the middle west should plan to attend this meeting. You can not afford to miss it. The business and social entertainment will repay the expense of attending. Don't forget the date—the first Tuesday and Wednesday in February.

J. I. GIBSON, President.

B. F. KAUPP, Secretary.

YORK COUNTY (PA.) VETERINARY MEDICAL SOCIETY.

The above society held its quarterly meeting in the National Hotel parlor, York, Pa., on Tuesday afternoon, December 1, 1908, with a good attendance of city and county veterinarians. Aphthous fever, or the foot-and-mouth disease, glanders, and tuberculosis, were discussed in general by the members present. The secretary reported a case of dumb rabies in a dog which had occurred a few days previous to the meeting, and Dr. Charles Lenhart a case of rabies in a cow. The next meeting will be held on the first Tuesday in March, 1909.

E. S. BAUSTICKER, Secretary.

We passed, in the course of an hour, two dead cows and more than fifty dead chickens. A strong smell of gasoline pervaded the atmosphere, and there were wheel tracks in the dust.

Sherlock Holmes became greatly interested.

"Watson," exclaimed he, after deep thought, "there has been an automobile along here!"—(*Louisville Courier-Journal*.)

MENTALITY OF DEEP SEA FISH.—Fish that inhabit the depths of the sea beyond the penetration of daylight depend largely in their search for prey on the senses of hearing and smell. One would think they would have no use for eyes at all; but nature has provided some of them with organs for the emission of phosphorescent light, and in some cases the eye itself performs the double service of illumination and vision. There is thus a feeble light in those gloomy depths. An examination of the brains of some of these creatures made recently in Germany by Dr. Trojan shows that the conformation of this organ, as well as the distribution of nerves, favors the senses of smell and hearing. The feeble development of the optic lobes and nerves indicates that vision is imperfect, while the powerful olfactory and auditory nerves, the huge "ear-stones" and the size of the corresponding brain centres show what a preponderant part is played by sounds and smells in the mental life, if such it can be called, of dwellers in the marine abysses.—(*Exchange*.)

NEWS AND ITEMS.

THE New York "Smoker" was a notable social event.

SOME men resemble goats; they can't help "butting in."

IT is the wise head that makes the still tongue.—(*Lucas.*)

MARK TWAIN: All education is preparatory. It is life that gives the finals, not college.

THE Colorado Veterinary Medical Association will hold its annual meeting in Denver on January 2, 1909.

LET us be of good cheer, remembering that the misfortunes hardest to bear are those that never come.—(*Lowell.*)

THE AMERICAN VETERINARY REVIEW is certainly a blessing to the profession.—(*J. C. Myers, M.D.C., Norfolk, Nebr.*)

THE annual meeting of the Pennsylvania State Veterinary Medical Association will be held March 2nd and 3rd, 1909.

TROOP M., Fifth Cavalry, will sail from San Francisco January 10th for Honolulu, which will be their permanent station.

THE difference between a man's handshake and the wag of a dog's tail is that the wag is always sincere.—(*Marion (Ga.) Patriot.*)

DR. C. COURTNEY McLEAN, of Meadville, Pa., was among the exhibitors at the 1908 National Horse Show, Madison Square Garden, New York City.

SECRETARY HAIL. C. SIMPSON reports that the prospects are very bright for a grand meeting of the Iowa Veterinary Association at Fort Dodge, January 19, 20, 21, 1909.

DR. W. REID BLAIR, veterinarian of the Bronx Zoological Park, New York, has under his charge nearly twice the number of animals as there are in the London Zoological Garden.

A SURE RULE.—De Canter—Is there any sure way to tell the age of a horse?

De Trotter—Yes. Ask the dealer and multiply by one-half.

TWO BAD BITES.—Diogenes being asked "What is that beast which is the most dangerous?" replied, "Of wild beasts the bite of a slanderer and of tame beasts that of the flatterer."

ON Thursday afternoon, January 14, Dr. Leonard Pearson will speak before the New Jersey State Board of Agriculture, in the State House, Trenton, on the Problem of Animal Tuberculosis.

THE Veterinary Medical Association of New Jersey meets at Trenton January 14th and the State Board of Veterinary Medical Examiners at the State House, Trenton, January 29, 30.

MYRTLE STATION, Ontario, Canada, Dec. 15, 1908.

Enclosed find exchange order for \$3.25 for REVIEW for year 1909, which is the best evidence of its appreciation by—
(Geo. L. Robson, V.S.)

AN EXCEPTION.—"Animals," said the teacher, "frequently become attached to people, but plants never do."

"How about burs, teacher?" queried the small boy at the foot of the class.—(*Chicago News*.)

THE Agricultural Department of the Transvaal is now under the direction of C. E. Gray, M.R.C.V.S., Principal Veterinary Surgeon of the Transvaal, during a six months' absence of Mr. F. B. Smith, Director of Agriculture.

ANNOUNCEMENT is made of the marriage of Dr. William Russell Fullerton and Miss Susan Marion Hantelmann, December 16, 1908, Chicago, Ill. Dr. and Mrs. Fullerton will be "At Home," Dubuque, Ia., after February 1, 1909.

EDITORS AMERICAN VETERINARY REVIEW:—Enclosed herewith please find check in payment of my annual subscription for the best veterinary journal on earth.—(O. L. Borr, Secretary Indiana State Board of Veterinary Medical Examiners, Muncie, Ind.)

EXPERIENCE.—"Experience would be a wonderful asset but for one thing."

"What's that?"

"You never can sell it for what it cost you."—(*Cleveland Leader*.)

COMPARISONS ARE ODIUS.—Perkins, Jr.—Why don't ye buy that horse of Seth's, pop? He's got a fine pedigree.

Perkins, Sr.—Pedigree! The question is, is he wuth anything? Why, boy, them sassiety folks what comes here in the summer has pedigrees.—(*Brooklyn Life*.)

CARL W. GAY, B.Sc., D.V.M., is the new head of the Agricultural Department of the Colorado Agricultural College. It is expected that Professor Gay will teach Zootechnics in the Veterinary Department. This will make six veterinarians on the campus engaged in teaching veterinary science.

THE SIOUX FALLS VETERINARY HOSPITAL is the name of a new veterinary establishment just opened by Drs. Graham and McGilvray at Sioux Falls, S. D. The hospital is equipped with all necessary appliances for the successful practice of veterinary surgery as well as for the treatment of sick animals.

EXPLAINED.—“Ma,” said Mrs. Malaprop's little boy, “what is ‘antimony?’”

“Sh, that's not nice to talk about!” replied Mrs. Malaprop. “It's what a lady gets when she's divorced from her husband.”—(*Exchange*.)

VETERINARIAN WILLIAM DIMOND has been selected as chairman of the committee to have charge of the tenth annual banquet of the Road Horse Association of New Jersey, to be held at the Kruger Auditorium, Newark, on Wednesday evening, February 3, 1909.

“SOME COMMON DISINFECTANTS” is the title of Farmers' Bulletin 345 issued by the Bureau of Animal Industry, December 17, 1908. In its preparation care has been taken to correct popular misconceptions as to the value and limitations of various disinfectants in general use.

CHANGED HIS AMBITION.—“It used to be the height of my ambition to own a motor car,” said the worried-looking man.

“And what is the height of your ambition now?” asked the friend.

“To sell it.”—(*Philadelphia Inquirer*.)

\$5,000 MONUMENT TO WAR HORSES.—A monument has just been erected at Port Elizabeth, South Africa, to the memory of the horses that died during the Boer war. It cost upward of \$5,000, and is in the shape of a stone watering trough, with a bronze cavalryman giving a drink to a horse.

DR. ELDRIDGE N. BROWN, C.V.C., '06, has received the appointment of Assistant Meat and Live Stock Inspector for the City of Nashville, Tenn. His term of office begins January 1, 1909. The Board of Health re-appointed Dr. Joseph Plaskett McGill, '93, as Chief Inspector, a position he has held for over six years.

DR. L. M. STECKEL, O.S.U. '07, formerly with the U. S. Bureau of Animal Industry, has gone abroad to take up post-graduate work at the Royal Veterinary College of Berlin. Dr. Steckel, before sailing, paid a visit to the REVIEW office. We wish him "Bon Voyage" and a safe return to the states after completing his studies on the continent.

A CONFERENCE for the veterinarians of New York state at the New York State Veterinary College, Cornell University, at Ithaca, N. Y., is announced for January 12 and 13. A very attractive program has been arranged, including lectures on important veterinary subjects, clinics and surgical exercises. The laboratories will be open for demonstrating to the visiting veterinarians modern methods of diagnosis.

DR. CHAS. A. MCKIM, state veterinarian of Nebraska, will leave Lincoln on January 11th to resume private practice in Norfolk, that state.

Dr. McKim has held the position of state veterinarian in his state since July 1905, and his friends in the profession will regret to learn that he has left the state service; which circumstance has been brought about through a change in the administration, as a result of the recent election. May good fortune attend the doctor in his return to his old field of practice.

VETERINARIAN FOR TUBERCULOSIS DIRECTOR IN KANSAS.—The constitution of the Kansas Association for the Study and Prevention of Tuberculosis, organized at the Governor's conference on Tuberculosis December 3, 1908, stipulates that one of the Board of Directors shall be a member of the state veterinary association. It is almost a foregone conclusion that Dr. Burton Rogers, Manhattan, Kansas, Secretary of the Kansas Veterinary Medical Association, who has an intensified interest in the subject, will be nominated for Tuberculosis Director at the forthcoming annual meeting of the state association to be held at Topeka, January 12 and 13, 1909.

ALPHA PSI FRATERNITY.—The biennial convention of the Alpha Psi Fraternity was held at the Alpha Chapter House, Columbus, Ohio, on the first and second of December, 1908. The new National Council are Drs. A. F. Schalk, president; R. J. Walker, Jr., vice-president; R. E. Warren, secretary; H. P. Gill, treasurer.

The social part of the evening was well arranged. On the evening of December first, the members of the Alpha Chapter gave a dance at the New U. C. T. Hall; and on the evening of December second, the retiring Council, the delegates, Drs. Cook, Reinhard, Schoen and Adams, and several members of the faculty were entertained with a "smoker" at the House.

CLYDESDALE AND PERCHERON STALLIONS FOR NEW JERSEY.—The State of New Jersey is now the owner of 3 Clydesdale and 8 Percheron stallions recently purchased in Europe by a committee of the State Live Stock Commission, consisting of E. T. Gill of Haddonfield, F. C. Minckler of New Brunswick, and Veterinarian T. Earle Budd of Orange. The stallions arrived the latter part of December and are now at the state farm at New Brunswick, where they will be kept until thoroughly acclimated. These stallions will be placed in charge of the several horse breeding associations for the purpose of improving the stock in New Jersey.

The action of New Jersey in establishing a commission to assume supervision of horse breeding in the state is in line with the tendency of the times throughout the United States and the countries of the world. Pennsylvania, Iowa, Minnesota, Illinois, Missouri, North Dakota, Utah and Wisconsin are among the states which now have a system of inspecting and licensing stallions kept for public service, but New Jersey is believed to be the first that has provided for state ownership of stock horses to be stationed throughout the horse breeding centres.

Dr. Budd reports a very delightful call upon Professor Liautard while in Paris.

BANQUET OF THE VETERINARY PRACTITIONERS' CLUB.—One of the most enjoyable social functions which it has been our privilege to attend was the annual banquet of the Veterinary Practitioners' Club of Hudson County, N. J., which was held at the Columbian Club, Jersey City, on Tuesday evening, December 15, 1908.

After full justice had been done to an elaborate menu, President Meiners called upon Dr. Thomas E. Smith to fill the role of toastmaster, which he did to the satisfaction and gratification of everybody. Hon. James Baker, a member of the New Jersey Legislature, responded to the toast "New Jersey" in an able and eloquent manner. Prof. James J. Hopkins, Principal of the Jersey City High School, delivered a masterful address on "Education as an Asset," setting forth in an incontrovertible manner the inestimable value of an adequate preliminary education before taking up the study of a profession, and pointed out, to the complete satisfaction of his auditors, why the preparation should be no less thorough or extensive for the study of the veterinary sciences than for any of the other learned professions. It is Dr. Smith's privilege to number this able educator, as well as the distinguished legislator, among his esteemed friends. Other toasts were responded to by Drs. F. C. Grenside, James L. Robertson, Geo. H. Berns, H. D. Gill and Wm. Herbert Lowe. The success of the affair was largely due to the efforts of the banquet committee, Drs. R. J. Halliday, J. L. Lindsay and T. E. Smith. The Veterinary Practitioners' Club is affiliated with the Veterinary Medical Association of New Jersey, and the REVIEW predicts that its potent influence will be an important factor in the advancement and upbuilding of the profession in that state.

GETTING AT A DOG'S MIND.—Is such a thing as animal psychology possible? One may reason about the processes of his own mind; he may even compare them with those of other minds, as described to him in words. But one can neither be a dog nor talk to a dog; how, then, may we be sure of what or how a dog thinks or of whether he thinks at all?

Now, a dog cannot talk, at least with human speech, but vocal utterance is not the only sign of what is going on in the mind. Signs unnoticed by the ordinary man have been skilfully discovered and utilized by the students of animal psychology, sometimes with a cleverness that is little short of astounding.

Take, for instance, a recent method devised by Dr. Zeliony, a Russian investigator, which may prove to be a key that will unlock a large chamber in the animal mind. He uses it, for example, to inquire how great a musical interval a dog is capable of appreciating, and he shows conclusively that a dog may tell the difference between musical sounds only a quarter of a tone apart—more than a good many humans are able to do.

This is how he does it:—The sight of food makes a dog's mouth water; in other words, it acts through the brain on the glands that secrete saliva. Likewise, almost anything associated with the idea of food will, by association, also make the animal's mouth water.

Dr. Zeliony feeds a dog day after day to the sound of a single musical tone, until that tone and the food are inextricably connected in the dog's mind. Thereafter the sound of that particular note will always cause secretion of saliva. But no other note will so act, and if the sound be higher or lower by more than one-quarter tone—no "watering at the mouth."

To the dog a sound having a particular pitch means food; one of another pitch does not, and he can detect that it is of another pitch when it is "off" by a quarter of a tone. This method is as convincing as it is clever, and its results are certainly astonishing.—(*Arthur E. Bostwick in the N. Y. Herald.*)

THE PHILIPPINE ISLANDS SAFEGUARDED.—Veterinarian G. E. Nesom, Director of Agriculture, with the approval of the Honorable, the Secretary of the Interior, under date of November 2, 1908, issued from the Bureau of Agriculture, Manila, General Order No. 12 prohibiting the landing of domestic animals infected with any dangerous communicable disease, or that have been exposed to such infection, at any port in the Philippine Islands except as provided for in said order. General order No. 12 is an amendment to General Order No. 10 issued June 5, 1908. The original order is materially amended, all of rule II being stricken out and the following substituted therefore:

1. Whenever any domestic animals, as defined in Section 1 of Act 1760, arrive in a port of the Philippine Islands from any foreign port and are found to be infected with or exposed to any dangerous communicable disease, as defined in Section 2 of Act 1760, such animals will be prohibited from landing except as hereinafter provided.

2. Imported animals found to be infected with or exposed to anthrax, on arrival in any port of the Philippine Islands will not be allowed to land, but must be taken, with all effects pertaining to them, beyond the jurisdiction of the Philippine Islands.

3. Whenever any domestic animals, arriving at the port of Manila from any port, are found to be infected with rinderpest or foot-and-mouth disease, the Director of Agriculture will grant

special permission for the discharge of any or all of such animals from the vessel or vessels on which they arrive, into suitable vessels or lighters on which they may be held at the port of Manila under the supervision of an authorized representative of the Director of Agriculture, until such time as they may be exported or slaughtered as hereinafter provided.

4. Any vessel or lighter or any other form of water craft to which animals are transferred, as provided in Section 3 of this rule, will be regarded as a quarantine corral and subject to the rules and regulations governing the same; *provided* that no animals held in quarantine on such vessel, lighter or water-craft will be permitted to land, except for immediate slaughter until the expiration of the minimum quarantine period required under the provisions of Section 1 of Rule I, General Order No. 10.

5. The Director of Agriculture will allow animals, so held in quarantine at the port of Manila, to be landed at a point designated by him, as near as practicable to the municipal slaughter house and to be conducted by the shortest practicable route, to be approved by him, into such slaughter house and to be killed immediately. The carcasses of such of them as are diseased and are unfit for human food at the time they are killed must be immediately transported to the city crematory and burned.

6. The Director of Agriculture will refuse to permit the transfer from the ship or vessel on which they arrive at the port of Manila to any other vessel, lighter or other form of water craft, or to the shore, of all animals hopelessly ill with any dangerous communicable disease or suffering from such disease to such an extent as to render them unfit for human food; *provided* that the Director of Agriculture will, in his discretion, authorize the killing of such animals on the ship or lighter, and their immediate transfer to the crematory where they must be immediately burned.

7. Landing privileges similar to those authorized in Sections 3, 4, 5 and 6 of this Rule will be extended to animals arriving at other ports of entry in the Philippine Islands, whenever such ports provide suitable slaughter houses, approved by the Director of Agriculture, in which animals may be conveniently landed and killed without danger of spreading infection.

This order shall take effect immediately upon its approval by the Secretary of the Interior.

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VETERINARY MEDICAL ASSOCIATION MEETINGS.

In the accompanying table the data given is reported by many Secretaries as being of great value to their Associations, and it is to be regretted that some neglect to inform us of the dates and places of their meetings.

Secretaries are earnestly requested to see that their organizations are properly included in the following list :

Name of Organization.	Date of Next Meeting.	Place of Meeting.	Name and Address Secretary.
American V. M. Ass'n.....	Sept. 14-17, 1909.	Chicago.....	R. P. Lyman, Kansas City, Mo.
Vet. Med. Ass'n of N. J.....	Jan. 14, 1909....	Trenton.....	W. Herbert Lowe, Paterson.
Connecticut V. M. Ass'n.....	Sept., 1909.....	New Haven ..	B. K. Dow, Willimantic.
New York S. V. M. Soc'y.....	Sept., 1909.....	Ithaca.....	J. F. De Vine, Goshen.
Schuylkill Valley V. M. A.....	Call of Chair.....	Reading.....	W. G. Huyett, Wernersville.
Passaic Co. V. M. Ass'n.....	Call Exec. Com.	Paterson, N. J.	H. K. Berry, Paterson, N. J.
Texas V. M. Ass'n.....	Monthly.....	Boston.....	R. P. Marsteller, College Sta.
Massachusetts Vet. Ass'n.....	Monthly.....	Waterville.....	Wm. T. White, Newtonville.
Maine Vet. Med. Ass'n.....	Monthly.....	Ottawa.....	A. Joly, Waterville.
Central Canada V. Ass'n.....	Feb. 2-3, 1909....	Lansing.....	A. E. James, Ottawa.
Michigan State V. M. Ass'n.....	April, 1909.....	Chicago.....	Judson Black, Richmond.
Alumni Ass'n, N. Y.-A. V. C.....	Jan. 5, 6, 7, 1909.	Chicago.....	T. F. Krey, N. Y. City.
Illinois State V. M. Ass'n.....	Not stated.....	Chicago.....	N. I. Stringer, Paxton.
Wisconsin Soc. Vet. Grad.....	Jan. 5, 6, 7, 1909.	Louisville.....	S. Beattie, Madison.
Illinois V. M. and Surg. A.....	Not stated.....	Winnipeg.....	Frank Hockman, Louisville.
Vet. Ass'n of Manitoba.....	Not stated.....	Raleigh.....	F. Torrance, Winnipeg.
North Carolina V. M. Ass'n.....	1st Wed. ea. mo.	141 W. 54th St.	Adam Fisher, Charlotte.
Ontario Vet. Ass'n.....	Jan. 12-13, 1909.	Columbus.....	C. H. Sweetapple, Toronto.
V. M. Ass'n, New York City.....	1st Wed. ea. mo.	Pittsburgh.....	W. Reid Blair, N. Y. City.
Ohio State V. M. Ass'n.....	Jan. 14, 1909....	St. Joseph.....	Sidney D. Myers, Wilmington.
Western Penn. V. M. Ass'n.....	Jan. 19, 20, 21....	Rochester.....	F. Weitzell, Allegheny.
Missouri Vet. Med. Ass'n.....	Jan. 13-14, 1909.	Ft. Dodge.....	F. F. Brown, Kansas City.
Genesee Valley V. M. Ass'n.....	March 2-3, 1909.	St. Paul.....	H. H. Taylor, Henrietta.
Iowa Veterinary Ass'n.....	Monthly.....	Philadelphia..	H. C. Simpson, Denison.
Minnesota State V. M. Ass'n.....	Jan. 2, 1909....	Philadelphia..	C. A. Mack, Stillwater.
Pennsylvania State V. M. A.....	Jan. 2, 1909....	Philadelphia..	F. H. Schneider, Philadelphia.
Keystone V. M. Ass'n.....	Feb. 2-3, 1909....	Denver.....	S. Lockett, Glenolden.
Colorado State V. M. Ass'n.....	Jan. and June....	Kansas City..	M. J. Woodliffe, Denver.
Missouri Valley V. Ass'n.....	2d Wed. in Aug.	Providence...	B. F. Kaupp, Fort Collins, Colo.
Rhode Island V. M. Ass'n.....	Jan. Apl. Jy. Oct.	Alameda.....	T. E. Robinson, Westerly.
North Dakota V. M. Ass'n.....	2d Tues. in Jy. '09	Los Angeles..	C. H. Martin, Valley City.
California State V. M. Ass'n.....	Jan. 12-13, 1909.	Sioux Falls...	C. M. Haring, U. C., Berkeley
Southern Auxiliary of California	1st and 3d Thur.	Grand Island..	J. A. Edmonds, Los Angeles.
State V. M. Ass'n.....	of each month	Topeka.....	J. A. Graham, Sioux Falls.
South Dakota V. M. A.....	Mon. and Que.	Lec. Room La-	H. Jensen, Weeping Water.
Nebraska V. M. Ass'n.....	val Un'y, Mon.	Not decided ..	B. Rogers, Manhattan.
Kansas State V. M. Ass'n.....	Monthly.....	Pullman, Wa.	J. P. A. Houde, Montreal.
Ass'n Médéciale Veterinaire Fran-	An'l, Jan., '09...	Indianapolis..	Gustave Boyer, Rigand, P. Q.
çaise "Laval".....	2d Thu. ea. mo.	St. P.-Minneap	D. A. Piatt, Lexington.
Province of Quebec V. M. A.....	.....	.....	Wm. D. Mason, Pullman.
Kentucky V. M. Ass'n.....	.....	.....	E. M. Bronson, Indianapolis.
Washington State Col. V. M. A ..	.....	.....	E. P. Flower, Baton Rouge.
Indiana Veterinary Association...	.....	.....	S. H. Ward, St. Paul, Minn.
Louisiana State V. M. Ass'n.....	.....	.....	Louis P. Cook, Cincinnati.
Twin City V. M. Ass'n.....	.....	.....	J. C. Robert, Agricultural Col.
Hamilton Co. (Ohio) V. A.....	.....	.....	C. L. Willoughby, Experiment
Mississippi State V. M. Ass'n.....	.....	.....	B. T. Woodward, Wash'n, D. C.
Georgia State V. M. A.....	.....	.....	W. G. Chrisman, Charlo'sv'le.
Soc. Vet. Alumni Univ. Penn.....	.....	.....	W. H. Martin, El Reno.
Virginia State V. M. Ass'n.....	.....	.....	A. F. Mount, Jersey City.
Oklahoma V. M. Ass'n.....	.....	.....	F. M. Ashbaugh, Wash., D. C.
Veterinary Practitioners' Club....	.....	.....	J. Madsen, Chicago, Ill.
Vet. Ass'n Dist. of Columbia.....	.....	.....	B. H. Merchant, Little Rock.
B. A. I. Vet. In. A., Chicago.....	.....	.....	E. S. Bausticker, York, Pa.
Arkansas Veterinary Society.....	.....	.....	R. H. McMullen, Manila.
York Co. (Pa.) V. M. A.....	.....	.....	C. H. H. Sweetapple, For.
Philippine V. M. A.....	.....	.....	Saskatchewan, Alta., Can.
Montana State V. M. A.....	.....	.....	J. M. Parks, Chicago.
Veterinary Ass'n of Alberta...	.....	.....	H. H. Counselman, Sec'y.
Chicago Veterinary Society.....	Wm. T. Conway, St. Louis, Mo.
Maryland State Vet. Society.....	
St. Louis Soc. of Vet. Inspectors.	

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